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Address.

THE COUNTRY DOCTOR AND THE HOSPITAL.*

By NATHANIEL W. FAXON, M.D., STOUGHTON, MASS.

In the medical profession the country doctor is likened unto the private soldier. His virtues and his valor are often extolled by the generals of the city, but few or no suggestions for his betterment are made. His shortcomings are brandished before him by specialists and he is often humbled by the great in hospitals who fail to consider the many handicaps under which he labors. Partly because of a fancied superiority and partly because of real advantages in the shape of laboratories, hospitals, and ease of consultation, the general practitioner has been taught or has come to look with respect or envy, or both, upon the physician in the city. Having partaken of this envy during my own experience as a country doctor, I have tried to find some way of improvement, and by your leave will suggest the following as a possible step towards improvement.

For many years there has been a constantly growing conviction among doctors and the public that the old ways of doctoring are not the best; that modern medicine and modern life are outgrowing their older forms, and that "old lamps must be exchanged for new." This has taken form as regards the public, in various legislative enactments, such as the Employer's Li-

bility Act, The Workmen's Compensation Act, and in the present agitation for sickness or health insurance. Among doctors suggestions have been made pointing out the advantages of group medicine with or without a hospital center or in some cases advocating state control of medicine, partial or complete.

At an address before a medical club in Boston some years ago, Ex-Pres. Charles W. Eliot stated that it was his belief that in the future "the practice of medicine would come to be divided between preventive medicine, surgery and the specialties," in this case classing internists as specialists.

In the last Ether Day Address Dr. Haven Emerson of New York said that "whether by organization, by endowment or by state employment, it seems to me that there must come a change in the basis of medical practice."

"The great fault," says Dr. Richard Cabot, "of English and German systems of sickness insurance is that they do not center themselves around organized groups of physicians, that is, around hospitals. They still rest upon the primitive conception of the doctor working alone, like the cobbler or peddler, not in organized groups." Dr. Hugh Cabot is even more dogmatic and is entirely convinced that group medicine must take the place of the individual, and looks forward to the development of group medicine with the hospital as its center.

The action of the legislature reflects a dissatisfied public, and quotations given above show a similar dissatisfaction among our profession. Both are searching for a solution. As my med-

* Delivered at the annual meeting of the Plymouth District Medical Society, April 19, 1917.

ical life has been in a country town, I may be pardoned for considering only what I believe to be applicable under these conditions. Group medicine with a hospital center we are familiar with only in cities and mainly as an organized charity. Its application to the country is really the subject of this paper.

Group medicine without a hospital center, or the voluntary grouping of several physicians, has become common in cities and has certain distinct advantages. It has been brought about by the division rendered inevitable by the rapid accumulation of knowledge. The general practitioner has been replaced by a group of specialists who, having pooled the results of their investigations, are able to come to a diagnosis with greater accuracy and also to provide more efficient treatment. It permits a gathering of apparatus for diagnosis and treatment beyond the means or use of any physician. It saves time for both doctor and patient; it also means less cost for the patient who, under this group system, may have the knowledge of many specialists for one fee.

On the other hand, there are obvious disadvantages. If incomes are pooled, so also must expenses, which increase rapidly with the group medicine system, be pooled and salaries must be paid. In other words, medicine ceases to be a profession and becomes a business. It means diminished personal relation to the patient; a real loss, although difficult to estimate in terms of money. Business is built upon advertising and the rigid collection of accounts, a thing doctors would desire but which at the same time we recognize would be taking advantage of others' misfortune. So while recognizing the efficiency of group medicine, we see that there are attendant evils that must be seriously considered.

I believe this kind of group medicine is distinctly a city product flourishing only under certain conditions and not transferable to the country. First—it requires suitable housing: a centrally located house large enough for several physicians, with offices, examining rooms, laboratories, etc.—something difficult to find in a town. Second—a habit among patients of consulting the physician in his office, which is not a strong feature of country practice. Third—a large population capable of supporting specialists in many divisions of medicine. I believe voluntary group medicine cannot be effective in the small town, but I also believe that the isolated general practitioner will work at an increasing disadvantage. *The collecting of group medicine around a hospital center is, I think, the best solution of the problem; first, because centralization appears to make for better doctoring; and second, because a hospital offers a logical center, both from the doctor's and the public's viewpoint—a condition not brought about by voluntary grouping.*

Any country doctor, I think, will agree that his greatest handicap is the lack of a hospital.

To have to send accidents, surgical cases, seriously ill medical cases, etc., 5 to 20 miles away, is a handicap, both to patient and physician. To the patient it may mean the difference between life and death. A hospital is also useful for the treatment of cases hardly serious enough to be sent away and yet which are scarcely suitable for home treatment. The accessibility of a town hospital allows friends and relatives to visit frequently and without expense, an item which would overcome many a patient's opposition to hospitals.

Furthermore, a hospital means attendance without delay, and better attendance because it allows of equipment beyond the reach of any doctor, as well as the assistance of nurses and other physicians. The possession of an ambulance will suggest one of the minor advantages to those who live where there is none.

From the viewpoint of the doctor, it increases his own efficiency because it gives him better facilities to work with. What the factory is to the manufacturer, the hospital is to the doctor. It allows him to work to advantage and to attend many cases which otherwise must be sent away. The loss of a case in this manner may or may not mean loss of income; it does mean loss of experience to the doctor and gradually loss of the confidence of the community. By this I do not mean that any doctor should attempt to treat all his patients, but continued sending of patients to hospitals sometimes for grave disorders, sometimes for slight, gives a little sting to the slur that country doctors are merely animated guideposts. The habit of turning troublesome problems of diagnosis or treatment over to someone else leads to slackness in thought and action, with inevitable deterioration of ability. Routine hospital data simplify many apparently obscure conditions, and how foolish we feel when the interne remarks in scornful tones that the "doubtful case" we sent in was merely a simple appendix. How unsatisfactory to send a patient to a far-away hospital with an uncertain but honestly uncertain diagnosis, to receive vague and scanty reports as to diagnosis and treatment. "Dr. So-and-So operated, I think, for fibroid. Doing as well as can be expected." After two weeks we are permitted to do the final dressing and inspect the healed wound. Ah, but you are welcome to come to the hospital at 9.15 and see Dr. So-and-So operate on your patient. We have all done it, arrived promptly at the hour set, after strenuous exertions to see a few necessary cases before leaving home, rushed in to comfort our former patient, received his grateful thanks, and then spent hour after hour awaiting the coming of the surgeon who was unfortunately delayed. Do not misunderstand me on this. I am finding no fault with the hospital authorities and surgeons; this is a plain statement of conditions that confront the country doctor, and because of this he loses experience,

he loses contact with fellow physicians and he drops behind because he cannot come in touch with medical progress. Rather a small, imperfect hospital in my own town than a modern model of medical and surgical perfection 20 miles away.

So much for the good effects of a local hospital for the individual, *i. e.*, the patient and the doctor. What now, will it do for the community? A local hospital centralizes the health organization of the community. It naturally becomes the headquarters and general meeting-place of all the physicians of the town. Time will not allow me fully to discuss the question as to whether all resident physicians of a town should be upon the staff. Permit me to state that in Stoughton we are agreed upon this as one of our foundation stones because of its manifest fairness.

Because of the gathering together of many patients it saves much time in attendance. It brings the physicians into more frequent contact with each other, with the natural interchange of ideas; promotes healthy discussion and frequent consultation, which, because of time saved, may be had at less or no expense to the patient. It prevents duplication and allows, as before stated, a greater equipment than can be privately supported. It provides a place for the care of accidents, with a central office for notification of accidents, preventing the confusion attending the usual summons sent for all the physicians in town. Operations can be performed by surgeons called, as desired without lengthy transportation, with the family doctor in attendance, to the mutual advantage of patient and physician.

A local hospital furnishes a headquarters for the District Nursing Association, and a center from which to call for nurses needed outside, for it should not be supposed that I imply that all sick must be treated at this hospital.

A local hospital should further become the headquarters of the Board of Health. So that we have now centralized under one roof all that pertains to the health of a community—the physicians and nurses for the care of the sick and the Board of Health for the prevention of disease.

The health of a community falls under three heads:

1. The prevention of disease, which naturally is the province of the Board of Health.

This includes;

- a. Prevention of communicable diseases.
 - b. Prevention of industrial diseases.
 - c. The correction of habits which determine or contribute to premature death.
2. Accidents.
 3. Sicknes.

The ideal Board of Health controlling an ideal community would be able to abolish all communicable diseases. Consider a community

in which there was no tuberculosis, typhoid, malaria, yellow fever, etc.; no diphtheria, and rarely the infectious diseases of childhood; no syphilis or gonorrhea, and you will gain some conception of what preventive medicine aspires to. Consider the supervision of industries so that there were no cases of lead poisoning, phosphorus poisoning, or any evil effects from chemicals; factories with no dust, well lighted, properly warmed and ventilated, and you will further appreciate what preventive medicine means. Imagine a people who at last have learned that alcohol, drugs, tobacco, overeating (gluttony), overcrowding and unhygienic ways of living produce disease and premature death, and you will see what a campaign of education and teaching lies before us all.

After we have done all these things, when there are no infectious diseases, no sickness from unhealthy conditions, no disease from bad habits, there will still remain plenty for us to do.

Accidents will always come. "Safety first" may be the watchword, but there can never be immunity from accident. Cuts, broken bones, trivial and severe, will always be with us and demand treatment.

After we have reached the meridian in preventive medicine, we still must realize that life is fleeting and death is certain. Sooner or later prematurely or in the due course of time, some cause will bring sickness and finally death. Those causes that we can prevent we should. Every illness and every death that might have been prevented is our reproach, but those we cannot prevent we should try to ease and ameliorate, lessen suffering and perhaps prolong life and render it more comfortable.

Surgery may cure or relieve cancer, ulcer of the stomach or intestine, diseases of liver and gall-bladder, diseases of the genito-urinary system, abscesses and all the ills of the pyaemic bacteria, empyaema, hernia, goitre, etc.; medical advice and treatment may aid diabetes, nephritic condition, anaemia, rheumatism, arthritis, cardiac disease, pneumonia and other respiratory diseases, constipation and colds, apoplexy, paralyses, epilepsy, insanity and old age or the wearing out of the human machine. The puerperal state demands careful attendance, watchful waiting and intelligent direction and operation. These and many others, in our present knowledge, we may aid but not prevent.

To sum up, I believe that every town may have a hospital as the center of its health organization. There will be the headquarters of the Board of Health—directing the control of preventive measures. There will be the headquarters of the physicians and nurses for the care of those cases that cannot be prevented. In the hospital itself there will be cared for:

1. Those cases best cared for in hospital, irrespective of home conditions.
2. Those cases best cared for in hospital because of home conditions.

3. Those cases desiring hospital care because of its certain advantages.

As a center for the Board of Health: The effectiveness of a health board depends upon the energy and intelligence of its members and upon the co-operation of the physicians of the district. The weakest point, in my own experience, both as member of the health board and as an outside physician, was the lack of communication between the board and the town physicians. A common center where reports of contagious disease could be easily transmitted to all physicians, would go far towards bringing about greater interest in prevention of such diseases. This would naturally lead to greater interest in all preventive measures, to discussion as to methods of greater efficiency in preventive medicine along the lines previously mentioned. In other words, it not only would serve as a registry for sickness but also as a center from which to direct prevention of sickness.

As a center for the physicians of a town it places them in a position collectively to command the services of surgeons and specialists in a way impossible individually. How often have we desired aid given only by those who have specialized, yet, hesitating to send the patient to some out-of-town hospital, have still been prevented, because of expense, from calling directly upon a specialist for advice. A hospital could provide necessary equipment for diagnosis, could associate with itself consultants and specialists and appoint stated times for the examination and advice to patients brought by the attending physician. Fees under such circumstances could be made within the means of all.

Around such a center could be built up the regular hospital service caring for accidents and emergency calls, and the charity work of any district or town.

Allow me to quote a paragraph from an article of Dr. Hugh Cabot, that agrees with many of the suggestions I have made.

"I therefore look forward to the development of group medicine with the hospital as its center, such hospitals to be under the management of trustees, who, it is to be hoped, will take their duties more seriously than do most trustees of today.

"It will probably be objected that this will involve the treatment of all patients in institutions, but this will not of necessity result, unless it be thought desirable. There is no substantial objection to the hospital's staff making visits at any reasonable distance without loss of the important advantages of medical grouping. It does not even seem to me impracticable to conduct country practice in sparsely settled districts upon a hospital basis. It would seem to me entirely feasible to use the towns and smaller cities as centers from which medicine should radiate. The younger members of the organization would do the work in the outlying districts, living there, if necessary, but always keeping in

close touch with their hospital center, and being promoted as experience and opportunity should dictate. It would thus come about that the younger practitioners would have thrown upon them the more laborious work, while the older members of the group would occupy the position requiring rounder judgment and fuller development, but neither the activity nor the enthusiasm of youth. We might in this way preserve all that is best in competition for that scientific achievement. We could undoubtedly permit the development of individuals along the lines best suited to their peculiar capacity, and get from each what he has best to give. We should avoid the scandals of inhuman charges and of indecent exploitation of suffering humanity by the sharks of the profession, and we might well avoid the tragedy by which the impecunious young doctor must select general practice, for which he is ill equipped, because he cannot afford to devote himself to the pursuit of pure science, for which he is best fitted."

I have now outlined a town hospital with a staff composed of all the resident physicians, who care for patients, within and without the hospital. How now can we reconcile community service with private competition?

There are three methods of organization to be considered.

1. Public. 2. Private. 3. Co-operative.

The public form is that supported by the community: state, county, municipal.

The private form is that supported by endowments from a single or from many sources.

Both are run without attempt at gain. They both admit and care for patients who are unable to pay for either hospital or medical care, and patients who pay what is supposed to be the actual cost of their maintenance, but who receive their medical attendance free. In some hospitals, a third class of private patients are admitted, who pay for both hospital and medical care. Naturally, only members of the staff may take advantage of this arrangement. Any physician holding a position on such a staff enjoys great opportunities. Although he may give freely of his time and skill to many without pay, he receives much in experience and renown and the opportunity to receive patients for pay, assisted by all the resources of such an institution.

This brings us to the third form of organization,—the co-operative; in towns where the community spirit is insufficient or such an organization seems undesirable or where it is impossible to raise sufficient funds to build and equip a privately subscribed hospital, it seems to me feasible, for the physicians of such a community, by means of co-operation and agreement, at least to make a start, however meagre, along this line, to their own and the community's advantage. Once the community is shown the benefits of such an arrangement, it will surely lend its aid. As to which form of organization is best, each community and each group of physicians:

must form their own opinion, governed by the existing circumstances.

In closing, let me sketch my own fancy of such a hospital group.

First of all, there must be the tangible hospital building, sheltering those dealing with the health of the community,—the board of health, the physicians and nurses, and providing a place to care for the sick. Ultimately, there will be gathered the offices of the physicians of the town, who will care for their own private patients in office and hospital, and for the charity cases of the town, according to whatever arrangement may be best, and whence they may go forth to the homes of those requiring attendance there. I will merely suggest here that such an arrangement would go a long way toward preventing the habit of some people in sliding from one doctor to another when their account had reached threatening proportions. There would be a central telephone desk with which all doctors would be in touch. Accidents (which are now usually a matter of chance, whoever happens to be within reach being the one to whom it falls) could be apportioned by a rotation system, or any system desired, to those wishing such calls. Duplication of apparatus and endeavor would be avoided; a central operating room and similar equipment would provide for all. A pathological laboratory would be feasible, the running of which would fall to that physician whose ability and inclination most fitted him for such work. Each physician would in the same way naturally follow that part of medicine in which he was most interested, thereby unconsciously and without loss of practice gradually becoming a semi-specialist. The possession of an efficient nursing corps, which could be called upon, whether in the hospital or for help outside, would be in itself a great aid in the care of sickness.

I hope my vision of such an organization is neither too socialistic nor too theoretical to be practical. I hope all here will express their views upon this subject, because only in this way may we achieve a thorough understanding and reach a definite conclusion.

Original Articles

A STUDY OF THE URINES OF PICRIC ACID WORKERS.

By F. O. WEST, M.D., WORCUM, MASS.

THE medical complaints of men engaged in the manufacture of picric acid having been treated in a general way,¹ this investigation was undertaken to determine the truth of the popular belief that the kidneys are seriously affected in those constantly exposed to this substance. If this belief is correct, the data collected illustrate what results may be obtained by a large manufacturing concern in preventing occupational disease. The means employed by this

company in protecting its men are suitable working conditions and strict medical supervision. The building is properly constructed for the work to which it is put; ventilation and lighting are adequate; exits are well placed; washing facilities are numerous; and the foremen take an interest in the men under them. On the medical side of the problem, every effort is made to acquaint the men with the dangers of the substances they handle; signs are posted in conspicuous places, urging them to be cautious; emphasizing the need of personal cleanliness; and the importance of refraining from the use of alcohol. First-aid racks are numerous and are inspected several times daily to prevent supplies becoming exhausted. At the company hospital an attendant is present at all times during the 24 hours, and all men are urged to report there regardless of how slight an injury may be. They are required to report, as a matter of precaution, when there has been no accident, as in cases where there have been more than the usual amount of "fumes" in the building. It is reasonable to expect a minimum amount of trouble as a result of such care.

CONDITIONS UNDER WHICH TESTS WERE MADE.

Examinations were made on the urines of the entire crew of picric acid workers, including machine operators, packers, men handling the dried powder, and the steamfitters whose duties were confined to this department. They were all seen at the same period and while engaged at their regular tasks; the working conditions not varying from those present at other times. The results were compared with the findings of the preliminary examinations which all picric acid men must submit to before being hired, and with the examinations that were made from time to time during the course of their employment.

The crew was made up of both whites and negroes. The length of service varied from one to eighteen months.

On carefully questioning the men and consulting the detailed medical records kept in all cases, no evidence was found of a symptom-complex that could be attributed to picric acid poisoning.

In regard to poisoning by fumes of mixed acid, our records show that 30 of the 57 men thus examined had been temporarily affected. The number of attacks which these men had varied from 1 to 11; the great majority were mild, a few were severe, none were serious.

TESTS EMPLOYED.

The urines were examined for the presence of albumin and picric acid.

Albumin: The test used was heat and acetic acid with filtered urine. Picric acid: Three tests were applied to all urines,—white wool, copper sulphate, and potassium cyanide. These were checked with control tests worked out on both normal urines and normal urines with known percentage of picric acid in solution.

1. Wool. The material used was obtained from a skein of the best white wool. Strands were soaked in the solutions for 24 hours, thoroughly washed in warm water and dried. In this manner a control seal was made from urines with picric acid 1:40,000, 1:80,000, 1:100,000, and a normal urine. The first dyed the wool a bright yellow, the second a faint yellow, the third a very faint but easily distinguishable color, while the wool from the urine was a dingy white.

2. Copper sulphate test. Control tests were made on normal urines with known quantities of picric acid as in the above. The solutions were made alkaline with ammonia hydrate and an aqueous solution of copper sulphate (diluted until the blue color disappeared, a 0.2% solution) was added. A positive test was indicated by the appearance of a green color which was unmistakably given in urines having picric acid in dilution as high as 1:80,000.

3. Potassium cyanide. To urines with known amounts of picric acid, sodium hydrate and a small amount of a saturated solution of the cyanide were added, and the mixture heated. No result was given by the solutions of high dilution. The blood red color of this test appeared only when the strength of picric acid was increased to 1:8,000.

RESULTS.

As above mentioned, all these tests were applied to the urine of each man examined, and the results were compared with those given by the control tests as described. There was, however, a chance for error. This arises from the presence of picric acid on the hands of the men at the time of examination and the possibility of its being carried to the genitals and thus contaminating the urine as it was being voided. Furthermore, it was noted in many instances that picric acid was on the outside of the urine glasses after the men had set them down. In spite of this possible source of error, of the more or less constant exposure of the men to mixed acid fumes, of the presence of picric acid on the skin and about the nostrils, the following results were obtained:

Number of urines examined	57
Urines containing only albumin	4
Urines containing only picric acid	2
Urines with both picric acid and albumin	1

The albumin in all cases did not exceed in amount "the slightest possible trace." The amount of picric acid present, according to the gradations of the scale established by the control tests, was not stronger in any case than dilutions of 1:80,000.

ANALYSIS OF RESULTS.

Albumin: of the five men with albumin in the urine, two had shown it before they went to work in the picric acid department, the man with both albumin and picric acid being one of these. Although albumin in the urine is one of the reasons for rejecting men wishing employment,

these men were accepted because of their otherwise unusually fine condition.

As regards the remaining three, their urines showed nothing wrong at their first examination. But I cannot find any evidence to warrant our attributing the albumin to the occupation: none of them had worked longer than five months; none had ever reported at the company hospital for "fume poisoning"; none had received any extensive acid burns; none had shown any acid dermatitis, and none showed any digestive disorders. Further to bear out this contention, additional data in regard to albumin in the urine were obtained from the medical records of former employees engaged in similar work. Twenty-nine men were thus investigated; they were taken at random and no effort was made to get selected cases. Length of service ranged from one week to ten months. In no instance was albumin present at the end of these periods. Moreover, of these twenty-nine men, seventeen had had fume poisoning; the number of attacks in each individual ranging from one to nine, with a total of 48, one being extremely serious, nearly resulting in death.

If the occupation causes irritation of the kidneys, we should expect to see evidences of it in those who had suffered ill effects, and not in those who had never been troubled by their work—a condition not discovered by this investigation.

PICRIC ACID IN THE URINE.

Two of the three men giving this test had been employed four months and the other fifteen months. The latter, a machine operator, was more liable to fume poisoning than the others. The first two were workers in the filter beds, and would be more likely to inhale the powdered substance. Nevertheless, none of these three men were more exposed to danger than any of the others, and they were not less cleanly. It is interesting to note that one man showing a great amount of picric acid about his nostrils had none in the urine.

RELATION OF PICRIC ACID TO ALBUMIN.

As only one of the three men showing picric acid had albumin also, and as the albumin in this case was present at the start, we cannot claim any ill effect on the kidneys from the picric acid.

SUMMARY.

The result of this investigation tends to show that picric acid may be manufactured without great hazard to the employee, provided the work is carried on under proper conditions and the men are subjected to rigid medical supervision. Of 86 urines examined for the presence of albumin, 3 gave the "slightest possible trace" at the end of employment, whereas it was not detected at the outset. Nevertheless, these three men had never been affected by any of the substances they were handling; while many men not given the test had been repeatedly treated,

one of this latter class having nearly died from the effects of fume poisoning.

In addition to the examination for albumin, 57 of these urines were tested for the presence of picric acid, and three were positive.

Unfortunately, the value of this information is open to suspicion, on account of possible contamination. If the picric acid had been excreted in the urine in these cases, we find no evidence of its having caused renal irritation.

REFERENCE.

¹ Journal of Industrial and Engineering Chemistry, March 1, 1917.

AN EPIDEMIC OF DYSENTERY AT THE BOSTON STATE HOSPITAL, DUE TO A MEMBER OF THE PARATYPHOID-ENTERITIDIS GROUP.

By MARY ELIZABETH MORSE, M.D., BOSTON,
Pathologist to the Boston State Hospital,
AND

GENEVA TRYON, M.D., BOSTON,
Assistant Physician, Boston State Hospital.

[From the Laboratory of the Boston State Hospital.]

I. INTRODUCTION.

THE so-called "asylum dysentery" still presents a problem as regards etiology, pathology and prevention. The finding of the Shiga bacillus in connection with numerous outbreaks has led to the assumption that it is always the causative organism. That other organisms may be concerned is demonstrated by the outbreak here reported, which occurred in the Infirmary Building of the Boston State Hospital in the spring of 1915. The cases were unusual, both clinically and bacteriologically, and therefore it seems of interest to report the epidemic. The severe cases were characterized clinically by acute dysenteric symptoms, and the fatal cases by septicemia and bronchopneumonia. The intestinal condition found in the autopsied cases was a widespread membranous ileocolitis. The cases of moderate severity had blood and mucus in the stools, without much prostration, while the mild cases had only diarrhea. The organism isolated in connection with the epidemic is a member of the paratyphoid-enteritidis group. In August, 1915, the disease reappeared in the Infirmary, and there was also an outbreak in the other buildings located near the Infirmary. Isolated cases occurred in the Infirmary during the winter of 1915-1916, and in the spring of 1916 small numbers in both the Infirmary and the Cowles Building. An effort was made to prevent the occurrence of the disease by prophylactic vaccination. Observations were made on agglutinin formation in the disease and after prophylactic inoculation. Skin tests were carried out with members of the paratyphoid-enteritidis group, and the leucocyte reaction was studied after prophylactic and therapeutic administration of vaccine.

II. EPIDEMIOLOGY.

The Infirmary is one of the buildings of the West Group, in which, as is seen by reference to Chart 1, are also the Cowles Building for chron-

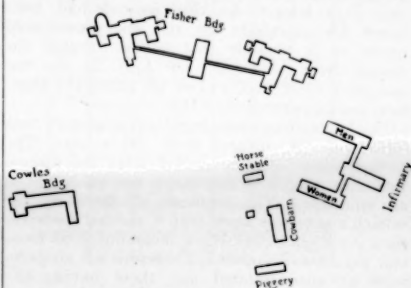


CHART 1. Buildings of West Group. Scale of feet: 100 = [line segment].

ically disturbed women, and the Fisher Building, containing wards for chronic men patients, officers' quarters, the kitchen supplying the entire West Group, and dining-rooms for the nurses and other employees of the Group; and, near the Infirmary, the cow and horse barns and the piggery.*

The first outbreak of the dysentery occurred in the Infirmary in April, 1915. In this building are about 380 patients, four wards each for men and women. The class of patients is limited to the elderly infirm and those having a chronic organic disease.

On the women's side the first case appeared April 15 and the last April 30. Eleven patients had the disease in a very severe form and of these six died. One nurse had a short but moderately severe attack, and three nurses had diarrhea.

On the men's side the first case developed April 24, the last May 13. There were eight cases, some quite severe, but none fatal.

The majority of the cases on the women's side came from a ward (V) on which the patients were up and about and some of them very untidy. The other cases, with one exception, appeared on the ward (VIII) to which those having the disease were transferred.

The first three cases occurred within three days' time and varied sufficiently in clinical signs so that they were not immediately classed together. The first appeared as a severe diarrhea in a very untidy senile dement; the second as a dysentery in an untidy parietic; the third patient showed lung signs twenty-four hours preceding the dysentery and died in five days. There was no autopsy. On April 20 the head nurse on Ward VIII, where these patients were isolated, had a diarrhea for one day, beginning twenty-four hours after the transfer of the patients to her ward. On April 25, when four more

* During 1916 the piggery was removed to a remote location and cow barns closed.

patients on Ward V had a dysentery, two nurses had a diarrhea, one of them being a night nurse working between Wards V and IV. On Ward IV a patient was taken ill with dysentery about two days later. As this patient had been cared for especially by the above-mentioned nurse, it is possible that she contracted the disease from the latter. On April 28, the last case on V developed, and on the thirteenth three new cases appeared on VIII.

In the earliest cases bacillary dysentery was ruled out by cultures from the stools. The clinical signs were so similar after the disease was once established that there was no doubt of an epidemic. The sequence of cases on the women's side was such that it seemed probable that the disease was being communicated from one person to another. Therefore all suspects were at once isolated and those having the disease were put in single rooms, with strict isolation and careful disinfection. On the suspected Ward V all untidy patients, whether having a diarrhea or not, were put to bed, and their stools inspected and disinfected. No new case developed on the women's side of the Infirmary between May first and mid-August, the beginning of the second outbreak.

On the men's wards, as on the women's, there was one ward entirely free from the disease. These were both wards on which nearly all the patients were bedridden. On the other wards of the men's side the cases occurred in such sequence that no conclusion could be drawn in regard to the mode of transmission of the disease. A nurse who slept on the women's side, but worked among the men patients, had a diarrhea at the date of the first onset among the men patients, but it could not be satisfactorily proved that she was the carrier. No new case developed on the men's side between mid-May and mid-August.

In the investigation of the source of the epidemic, attention was directed first to the food and milk supplies. The food supplies for the entire West Group are brought over daily from the main storehouse at the East Group, a quarter of a mile distant. The milk comes partly from the hospital herd, and partly from a city firm. The food for all persons in the West Group (staff, employees and patients) is prepared in the main kitchen at the Fisher Building (see Chart 1) by three cooks, assisted by six patients from that building. The nurses in each ward are assisted in serving the food by several patients living on the ward.

Identification of the organism concerned in the epidemic as a member of the paratyphoid-enteritidis group at once brought the meat under suspicion, in view of the association of bacilli of that type with epidemics of meat poisoning. Cultures were made from the surface and interior of meat and poultry in the West Group refrigerator at the beginning of the epidemic, but the results were negative. Cultures from

the milk of both the State Hospital and outside supply were also negative.

Investigation of the West Group kitchen employees and patients, also of the porter and his assistant (patient) who delivered food to the Infirmary, elicited no history of diarrhea and they all gave negative agglutination reactions with the epidemic organism. Cases of diarrhea among the patients of the East Group at this time yielded neither the organism nor an agglutination reaction, and at no time since has there been a case of this infection at the East Group. The limitation of the disease to the West Group suggested a contamination of the food after reaching the Group. The examination of food and food handlers was made before the two isolated early cases, described in the following paragraph, were discovered.

Finding the agglutination test positive among the nurses who had a diarrhea during the first outbreak brought up the question of possible cases previous to that time. Two such were found: a woman patient who had had a diarrhea for one day only (April 4, 1915), who was not on the ward on which dysentery first developed, and a man patient, who is not recorded as having intestinal symptoms, but who on March 20, 1915, had an indefinite illness characterized by fever and muscular weakness.

A review of death and autopsy reports furnished no clue to earlier cases. There had been no epidemic of any kind at the hospital since a paratyphoid A infection in 1910.

The West Group refrigerator was out of use during the first two weeks in April, 1915, while it was undergoing repairs, and during this time the food was kept in makeshift places. The reconstruction of the refrigerator was necessitated because it failed to keep the food cold and was not mouse-proof. For a few weeks before the acute outbreak there had been quite a number of mild diarrheas among the nurses and attendants, also affecting some other persons in the Group, but not sufficiently severe to incapacitate them. No attention was paid to these attacks at the time, and only detailed inquiry later elicited a history of them.

A remotely possible complication of the situation is the fact that in the spring of 1914 hog cholera was epidemic among the pigs, and again in August, 1915. Hog cholera is thought to be due to a filterable virus, but associated with the latter are various members of the paratyphoid-enteritidis group. The most frequent of these is *B. suis*, which was at one time thought to be the cause of the disease. The exact relationship of these organisms to the lesions is still undecided. *B. suis* is supposedly non-pathogenic for man, but a number of human infections proved to be due to it have been reported. These were of the acute intestinal type. The occurrence of hog cholera the year previous to the human epidemic, the known association of the paratyphoid-

enteritidis group with hog cholera, the finding of a member of the group as the cause of the human epidemic, and evidence which tended to show that the latter was not due to a suddenly introduced food infection, raised the question of a possible connection between the animal and the human epidemic. Cultures were made from the lymph-nodes and spleen of a hog-cholera animal killed at the hospital in August, 1915. The organism proved to be of the colon bacillus type, and by agglutination reactions did not show a close relationship to the bacillus of the human epidemic.

From a review of the first outbreak it seems probable that the immediate source of the epidemic was not a suddenly introduced food infection; that the disease was communicated from one person to another; that it was endemic, and that previous mild cases of diarrhea among patients and employees had been overlooked. There is a possibility that the cause of these diarrheas may have been contamination of the food in the refrigerator by rats and mice, as these animals frequently harbor bacteria of this group in the intestine (mice, *B. suipestifer*; rats, *B. enteritidis*).² It may be possible that these animals were the connecting link between the hog cholera and the human epidemic.

The second outbreak began in mid-July with mild attacks of diarrhea among the nurses at the Cowles Building. These were not mentioned until dysentery appeared among the patients of this building early in August. The Cowles contains about 125 chronically disturbed women, young or in early middle life, and nearly all strong physically. From August first to October there were 24 cases, and no ward was exempt.

In mid-August came a recurrence in the Infirmary, on both the men's and women's sides, without regard to wards. About the same number of patients had the disease as in the spring, but there was only one fatality. The last group of cases was on the women's side, one case on September 30 and nine between October 23 and 27.

In mid-August and early September there were also a number of cases of diarrhea and dysentery in the Fisher Building among patients, nurses and officers.

As to the mode of transmission of the disease in the second outbreak, there seems no doubt but that flies played a leading part, for they were very numerous in all the buildings of the West Group. The buildings are incompletely screened. As breeding-places for flies should be mentioned the stables, barns and pigery which were situated within a few hundred feet of the buildings for patients.

III. CLINICAL DESCRIPTION.

The following is a description of the disease as it appeared on the women's service of the Infirmary during the first outbreak. The disease, as a whole, presented such a definite

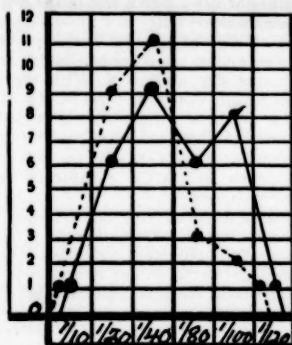


CHART 2. Agglutination reactions in third and fourth weeks after onset.

— Dysentery cases 22
- - - - - Diarrhea cases 27

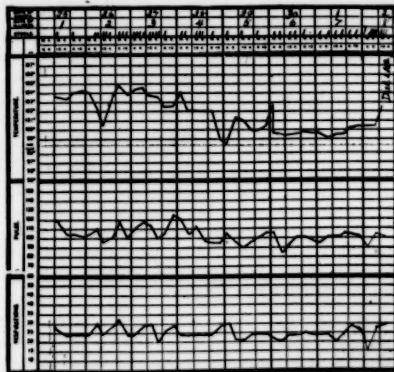


CHART 3.

picture that it is unnecessary to describe individual cases. The duration in recovered cases was about three weeks, in fatal cases five to ten days. The incubation period could not be definitely ascertained, but the limits were apparently twenty-four hours and seven days. The onset was characterized by prostration, headache, backache, and large watery stools containing mucus and blood.

The temperature curve was somewhat variable. The initial temperature was between 99° and 104°, but was usually high, remaining so from three to five days, then dropping gradually during one or two days to 99°, and remaining there for about a week before returning to normal. Occasionally there was a rise to 101° after the fall. The pulse was usually high with the temperature, 110 to 120. One fatal case, however, had an initial pulse of 100 with a

temperature of 104°, with a rise in the pulse rate as the temperature fell.

A few hours after the onset the tongue became dry and covered with a white fur and the lips were dry and red. With the fall of temperature the tongue gradually became moist, but the heavy white coat persisted after the dysentery had ceased, even as long as three weeks.

There were no throat symptoms and no glandular enlargement.

The liver and spleen were not enlarged, either at the beginning or as the disease progressed.

Nervous symptoms were not prominent. The headache disappeared within twenty-four hours. Two of the fatal cases became restless, picking at the bed-clothes.

The skin showed no rose spots. The face was much flushed during the high temperature, then the face and body became sallow and the skin dry.

The appearance and number of the stools were quite characteristic, six to eight in twenty-four hours, large, watery, brown, containing blood and mucus. The odor was exceedingly foul. In one fatal case, two days before death there was a severe hemorrhage, with large clots of blood. In another fatal case there appeared large pieces of mucus, almost like casts of the intestine. In the severe cases that recovered, the dysentery persisted two to three weeks.

The abdomen was soft and usually not tender. There was some tenesmus for the first few days. In one fatal case the abdomen became distended with gas a few days before death.

There was marked muscular weakness, persisting weeks and even months after recovery from the dysentery. The muscles became very soft and the patients lost weight early.

Clinical Tests.—The urine showed a trace of albumen. The blood picture varied somewhat in different patients and in the same patient during the course of the disease. In no case did an anemia develop. The total white count was rather more variable than the differential, ranging between 5,000 and 10,000, and not decreasing with the progress of the disease. In the severe cases, uncomplicated with pneumonia, the polynuclears were between 54% and 66% during the first two weeks, the lower per cent. for the individual being in the first week. The lymphocytes persisted rather high, between 27% and 40%. Eosinophiles were not found in any case examined during the first week; in the second week they reappeared in .5%-2%. Transitionals gave a higher per cent. in the first than in the second week. The blood picture of the third week was practically the same as that of the second week both for protracted cases and convalescents. In the pneumonic-dysenteric cases, the polynuclears were relatively higher, 72%-77%, but the total count was only moderately increased, 8,000-12,000; in the recovered cases

of this class, the lymphocytes showed a high per cent., 37%-43% in the third week. In all cases blood platelets were much increased.

Blood cultures taken in two cases during the first week were negative. A culture from the urine in one very serious case that recovered was negative for the epidemic bacillus, but yielded a streptococcus.

The diagnosis was made from the clinical signs, finding the organism in the stools, and by the agglutination test (see sections on bacteriology and agglutination).

Convalescence was slow because of extreme muscular weakness and recurrence of diarrhea with any but the most careful diet.

Sequelae were not observed, unless the muscular weakness may be regarded as such.

The diet and medical treatment were about the same in each case. Boiled or plain milk and barley water were best taken, and any change from this routine in early convalescence invariably brought back blood or mucus in the stools. At the beginning of the outbreak some days were spent in experimenting with ipecac and morphine and antiseptic or astringent irrigations. The drugs had no effect on the dysentery and the irrigations were irritating. The following treatment was then adopted: a daily high saline irrigation and strychnia sulph. gr. 1/60 t.i.d. by mouth. Castor oil was used at the onset and for constipation during convalescence.

Vaccine therapy was tried in two protracted cases. The doses were small, beginning with 50,000,000 and increasing 25,000,000 with each dose until four doses had been given, the injection being made every second day. It may have been a coincidence that convalescence began during this treatment.

The mild attacks among the nurses were characterized by a diarrhea lasting about twenty-four hours, with numerous offensive watery movements, accompanied in some instances by griping pains. The diagnosis was made later by agglutination tests.

The clinical description of the second outbreak in the Infirmary, from August to October, 1915, corresponds to that of the first, except that the disease was of shorter duration and less severe. The diagnosis of bronchopneumonia was made in two cases about twenty-four hours before the dysentery appeared. Among the patients in the Cowles Building the acute stage of dysentery lasted about three days. It was often ushered in with nausea and vomiting, a sharp rise in temperature and increased respiration. The patients were kept in isolation from seven to ten days and recovered with their former physical activity. The cases among the employees were short attacks of diarrhea or dysentery lasting from one to three days.

An acute arthritis of the knee joint developed in one of the less severe cases ten days after the onset and two or three days after recovery from the intestinal disturbance. The highest tempera-

ture during the arthritis was 101°. A week later the other knee became involved, the temperature again rising to 101°. The leukocyte count was 10,000 with polymorphonuclears 71%.

Differential Diagnosis.—The paratyphoid group of infections is usually divided clinically into a gastro-enteric and a typhoid form, to which it appears, from the present observations, and those accumulating during the present war, a third form, the dysenteric, should be added. Bainbridge² maintains the view that *B. Gärtneri*, *B. suipestifer*, and *B. typhi murium*, associated with food and especially meat poisoning, cause the gastro-enteric type, while *B. paratyphosus A* and *B.*, spread by human carriers, and never found except in connection with human disease, cause the typhoid form. Uhlenhuth and Hubener,³ on the other hand, consider paratyphoid *A* and *B* also as a cause of acute food poisoning, and state further that the different clinical types may appear in the same epidemic. During the present European war the British have made numerous reports of paratyphoid *A* and *B* infections, describing chiefly the typhoid form, but mentioning also a dysenteric.⁴

The typical gastro-intestinal form comes on suddenly, usually from twelve to forty-eight hours after eating infected food, with headache, chilliness, pain in the abdomen, and vomiting, followed by a rise in temperature and pulse, and a diarrhea. The stools are described as exceedingly offensive, and muscular weakness, both during the acute stage and convalescence, is very marked. The acute period lasts two to five days, and the total duration of the disease is about one week.

The typhoid variety resembles a mild form of true typhoid. Sequelae are frequent, the most common, perhaps, being an arthritis. Serious local lesions, such as abscess of the lung or osteomyelitis, may follow paratyphoid *B*.

Short descriptions of the dysenteric form have appeared during the war from British and Austrian sources. Bassett-Smith⁴ remarks that cases (military) coming home labelled "dysentery" should be regarded as potential paratyphoid, because many of them are found to be that. C. Miller⁵ regards the dysenteric as the most severe form of paratyphoid infection seen at the Netley Hospital. The majority, and most of the severe cases, are due to paratyphoid *A*. He describes the patients as emaciated, blue and pulseless, often showing a petechial rash, subcutaneous hemorrhages, and an aphthous stomatitis and pharyngitis. There is constant flux of pink mucus in small quantities, with tenesmus. The mortality is high.

Korezyski⁶ describes four cases of paratyphoid dysentery with autopsy. The disease attacked persons who were physically reduced, and toxic features were prominent. He divides the cases into two groups, the enteric, in which the lesions (hemorrhage into mucosa and occasional ulceration)

are situated in the small intestine—the stools are feculent, with only traces of blood, and tenesmus is absent; and the dysenteric, in which there is an inflammation of the large intestine, and stools are numerous, small, with much blood and mucus, and there is tenesmus and pain over the descending colon.

The present disease has clinical features of both the typhoid and gastroenteric varieties, but differs from the usual picture of both. It agrees with the typhoid form in the presence of a septicemia, respiratory symptoms, and arthritis as a sequel, but, considered as a whole, does not give at all a typhoid picture. It resembles the gastroenteric form in that the symptoms, except in the most severe cases, are predominantly intestinal (although in the typical gastroenteric variety these are usually of the acute diarrheal, and not of the dysenteric type), and in the marked muscular weakness. It differs from it, however, in the absence of nervous symptoms and of the features of an acute intoxication. It is conceded, however, that the gastroenteric form may vary in its course, that it may be of long duration, with irregular fever, diarrhea and bronchitis, also that systemic infection may follow the acute stage.

The disease which the ordinary severe case resembles most clinically is, however, neither of the chief forms of paratyphoid infection, but bacillary (Shiga) dysentery. A comparison of the main features of the two diseases is therefore given:—

BACILLARY DYSENTERY (SHIGA)

EPIDEMIC DYSENTERY B. S. H.

Onset

Acute diarrhea and colic.

Acute diarrhea or dysentery. Nausea and vomiting may be first symptoms.

General Symptoms

1. Temp. 101°-102° F. Severe cases, 104°.
2. Headache, general malaise, and in severe cases, muscular pains.

1. Temp. 99°-103° F. at onset. Slightly irregular course.
2. Headache, backache, aching in limbs at onset. Prostration.

Abdominal Symptoms

1. Pain, severe colic.
2. Tenesmus, marked.
3. Tenderness on pressure.
4. Abdomen usually somewhat excavated.

1. Pain early in disease and not severe.
2. Tenesmus early in disease and not marked.
3. Tenderness not usual.
4. Abdomen usually soft and normal in appearance. Excavated in 1 fatal case. Distended in 1 fatal case.

Tongue

Moist, somewhat coated in slight attacks. Thick, dirty brown coat in typhoid dysentery.

Moist in mild cases and dry in severe cases. Heavy white coat.

Character of Stools

1. Diarrhea at onset not characteristic.
2. Mucus, small amt. at first. Pure mucus and blood within 2 to 3 days.
3. Quantity is small; an ounce or less, and stools are frequent.
1. Large, brown watery stools. Odor very foul.
2. Flecks of mucus and blood may appear at onset or after 1 to 2 days. Both usually absent in mild cases.
3. May continue large and watery or become small in amt. About 8 stools in 24 hours in both mild and severe cases.
4. Constipation in convalescence.

Lung Symptoms

None.

Respiration increased in nearly all cases at onset. Bronchopneumonia and multiple abscesses of lungs in fatal cases.

Bladder Symptoms

Tenesmus.

No bladder symptoms.

Incubation Period

2 to 4 days.

24 hours to 7 days.

Duration and Course

Light cases, 4 to 8 days.

Duration of light cases, 1 to 4 days.

Severe cases, 3 to 6 weeks.

Duration of severe or fatal cases, 5 days to 3 weeks.

Disease may become chronic.

Recurrences, but chronic cases not observed.

Complications and Sequelae

Parotitis, ascites, peritonitis. Prolapse of rectum frequent.

Acute arthritis, 1 case.

Vomiting, 1 case.

Prolapse of rectum, 1 case.

Muscular weakness, all cases.

occurred among the majority of this class. The treatment was discontinued among the very feeble patients because of the disturbing effect of the reactions.

From January, 1916, when prophylactic treatment was given, to July, 1916, there were seventeen cases of diarrhea among the women patients of the Infirmary. The cases were scattered and few in the winter, but appeared in groups on certain wards in the spring. Of these 17 patients, ten had been vaccinated (eight with three doses and one each with one and two doses); three had suffered from the disease in 1915, and four had had neither the disease nor the inoculations. All attacks, except one, were mild and short. Some of the patients had only a slight rise in temperature, but all were somewhat prostrated. The exception was a fatal case (see case 5, pathological section) of a severe dysentery, in a senile dement who had refused vaccination; but it should be stated that she had not recovered well from a recent pneumonia and was found also at autopsy to have a subdural hemorrhage. Eight of the seventeen cases were on Ward V, which was the hotbed of the disease in 1915.

In the Cowles Building, also, there occurred in May, 1916, three cases of the short dysenteric type in patients who had not previously had the disease.

Although these experiences indicated that neither prophylactic vaccination nor a severe attack gives more than transient immunity, vaccination was continued in July, 1916, all of the Cowles patients, and all additional women Infirmary patients who were strong enough for the treatment, being given three doses.* It was hoped that by vaccinating shortly before flytime, an immunity of sufficient duration might be produced to tide the patients over that season; and that even if the disease could not be entirely eliminated by prophylactic vaccination, at least its type might be reduced from the severe dysenteric to the mild diarrheal.

From July 1 to October 15 there were 6 cases of diarrhea among Infirmary patients who had been completely vaccinated, 5 among those incompletely vaccinated, 2 in patients not vaccinated, and 6 recurrences in unvaccinated patients. There was also one case of dysentery and several of diarrhea among the 125 inoculated Cowles patients.

Tabulation of the results on the women's side of the Infirmary gives the following:—

* The inoculations were made by Mr. John C. Rock of the Harvard Medical School, laboratory interne for the summer of 1916.

IV. PROPHYLACTIC VACCINATION.

In December, 1915, and January, 1916, prophylactic vaccine treatment was given to 125 women patients in the Infirmary. A formalized vaccine was used, prepared from seven strains isolated in the spring and summer of 1915 from the feces of given clinical cases, also from the hearts' blood of two autopsied cases. The especially feeble or sick and those who had had the disease were excepted from treatment, and a few other patients refused to be vaccinated. Fifty-one of the stronger and more active patients were given three inoculations, one week apart, the first 500,000,000 and the remaining two 1,000,000,000. A local reaction was usual, but in only a few instances was a constitutional one observed.

Thirty-two patients received two inoculations and forty-two only one. The latter patients were among the bedridden, in whom the local reaction was, as a rule, very marked, with redness and swelling of the entire arm. A constitutional reaction, characterized by prostration, also

	CASES AMONG THEM.	REMARKS.
Total patients completely vaccinated from Dec., 1915, to Oct., 1916,	64	13 All diarrheas.
Incompletely vaccinated ...	72	8 All diarrheas.
Not vaccinated	65	7 1 fatal dysentery.
Total women infirmaries patients having disease in 1915	41	1 dysentery (short). Rest diarrheas.
Recurrences among these (not vaccinated)	9	

The majority of the cases occurring after vaccination and among those not vaccinated are in patients who are feeble yet not strictly bedridden. New bedridden patients do not usually acquire the disease. The recurrences are in patients who at the time of the first attack were feeble and have since become bedridden. They are, in general, much milder than the original attack, and a number were so slight and transient that they would have passed unrecognized if special study were not being given to the subject.

That the new cases and recurrences are due to the epidemic organism is evidenced by the appearance of agglutination reactions in the former and the persistence of reactions at comparatively high dilutions among the latter after attacks.

Agglutinins range usually from 1/80 to 1/150 within one month after vaccination and persist at a low level (1/10) for at least 10 and 11 months (see section on agglutination).

It is evident that immunity after this disease is, at least in feeble persons, irregular and probably usually of short duration. In this respect it resembles Shiga dysentery. The duration of immunity after the various forms of paratyphoid infection is not definitely known.

It is clear, also, that as brilliant results cannot be obtained from prophylactic vaccination in this disease as in the case of either typhoid or probably the typhoid form of paratyphoid. The difficulties are two: the first inherent in the transient character of the immunity; the second due to the fact that the disease is particularly prone to attack debilitated persons, who as a rule do not stand prophylactic vaccination well. Nevertheless, the writers are convinced that without it cases of the disease would have been more numerous, and, particularly, more severe during the present year, and that it should be continued upon all suitable exposed patients as another way of combating the disease among a class of patients with whom it is difficult to carry out rigorous hygienic measures because of untidiness and lack of co-operation. It is notable that cases after prophylactic vaccination were decidedly fewer at the Cowles Building than at the Infirmary, this being due, doubtless, to the stronger physical condition of the former patients. The differences found in the leucocytic reactions of strong and weak patients after doses of vaccine (see section on leucocytic reaction) give a further suggestion on this point. It seems probable that prophylactic vaccination among a fairly strong class of individuals is of considerable value, and that results might be

much better among the general population or in armies than in insane hospitals.

The writers have been unable to ascertain that until the present war prophylactic inoculation against members of the paratyphoid-enteritidis group has been tried on a large scale, or that it has ever been undertaken under institutional conditions. Vaccination against paratyphoid A and B is now, of course, being practised extensively in the European and United States armies, in conjunction with antityphoid inoculation, but data on its efficiency will not be available for some time.

Several experiments in vaccination on a large scale against bacillary dysentery have been made, both in European insane hospitals and among the general population. In the former, the results, although not given in detail, are said to have been successful in stopping an epidemic. Shiga* in 1898 to 1900 inoculated about 10,000 persons in a district of Japan where epidemic dysentery prevailed most seriously, and diminished the mortality from 20-30% to about zero.

V. SKIN REACTIONS.

Tests for specific skin reactions were tried with a few patients, of whom 12 had had the disease one to twelve months previously; ten had received prophylactic treatment one to nine months previously; and seven had had neither the disease nor prophylactic treatment. Tests with paratyphoid A, B. suipestifer and B. enteritidis were also made with these same patients. The method was the same as that described by Gay and Force⁷ in 1914 for the typhoidin skin reaction, concentrated five per cent. glycerine broth cultures being used, with a similarly concentrated glycerine broth solution as a control. The intradermal was preferred to the scratch method as the reaction with the latter was too delicate and transient and often difficult to distinguish from trauma. Different dilutions of the glycerine broth culture were made with normal salt solution (lowest 1-2, highest 1-12) with a desire to find what strength would cause a perfectly distinct reaction in the immune and a negative one in the non-immune individual. By the intradermal method a bleb was formed by the injection of .1 cc. of the dilution, a short needle of a given caliber being used in all cases.

The reaction from the control dilutions was a slight redness of a few mm. at the point of injection, disappearing in less than 24 hours. The reaction from the culture dilutions was an erythema of a diameter varying with the strength of the dilution, and having, in some

cases, a darker red indurated center. The reading was made at the end of 24 hours. The indurated area sometimes persisted for a week.

The following observations were made:—

1. The control patients showed reactions that were often difficult or impossible to distinguish from the reaction in those who had the disease.

2. The reaction varied somewhat in intensity in different individuals, but this did not correspond to the time lapsing between the attack or prophylactic treatment and the test, nor was it more marked in those who had had the disease.

3. In nine cases in which agglutination reactions were made within a few days or three weeks after the skin test, comparisons were made. One patient who had the disease 10 months before showed severe local reaction from a low dilution (1-2) of the different cultures and a constitutional reaction, with fainting and nausea; three weeks later the agglutination reaction was entirely negative. There were equally marked skin reactions in two patients having agglutination reactions of 1-10 and 1-150 three weeks later.

4. High dilutions caused a doubtful or negative reaction, in certain patients who had had the disease, although causing a distinct reaction in some control cases.

5. Skin tests made with similar broth cultures of other members of the paratyphoid group showed reactions varying slightly in intensity in the different individuals.

6. The concentrated glycerine broth cultures, made up at different times, varied in their results, and apparently deteriorated in a short time, so that any standardization of dilutions was not possible.

These observations would indicate that the intradermal skin reaction with the concentrated glycerine broth cultures has not been of any clinical value in testing the duration of immunity in these cases, or in distinguishing this disease from infections by other members of the paratyphoid group.

Those who have studied the typhoidin skin reaction vary in their conclusions regarding it. Gay⁸ considers it of value in indicating the duration of immunity in those having received prophylactic treatment, that re-vaccination is indicated when the skin reaction is negative. Kolmer and Berge⁹ in their study of the typhoidin skin reaction observed that a reaction could be obtained over a longer period in those who had had the disease than in those having had prophylactic treatment only. They found agglutinins and complement-fixing antibodies usually present in those reacting to the skin test. Kolmer and Berge used a powdered typhoidin and control furnished by Gay but, because of the severe reaction caused by the control, they regarded the reading of the tests as subject to error.

An effort will be made to test these patients

with powdered cultures of the same members of the paratyphoid group, before setting aside the skin reaction as of no clinical value in this disease.

(To be continued.)

A YEAR'S WORK WITH THE WASSERMANN TEST, IN THE BOSTON HEALTH DEPARTMENT LABORATORY, WITH ESPECIAL REFERENCE TO DOUBTFUL REACTIONS.

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SINCE the publication of Bordet and Gengou, 1901, describing the phenomenon of complement fixation, many observers have endeavored to apply this test for the diagnosis of the various infectious diseases. Among such investigators were Wassermann and Bruck, who in 1905 were endeavoring to establish a test for tuberculosis by this important reaction.

About this time Hoffman and Schaudinn demonstrated the causative organism of syphilis, the *Spirocheta Pallida*. This discovery stimulated many workers to further effort, and we find the first publication, in May, 1906, by Wassermann and Bruck, describing the phenomenon of complement fixation in the diagnosis of syphilis.

Their work led many research workers to investigate this test, and practically all confirmed their findings.

In 1907 Weygandt reported fairly reliable results, using a watery extract of normal human spleen as an antigen.

About the same time Marie and Levaditi reported similar results, using an aqueous extract of normal fetal liver.

In December, 1907, Landsteiner, Muller and Potzl reported very favorable results, using an alcoholic extract of guinea pig heart as an antigen.

Up to 1911 all work in this test was in the experimental stage. Since then various boards of health, especially those of the larger cities, have added this test to the regular routine work which is carried out in municipal laboratories for physicians.

The Boston Health Department also considered the establishing of this test, but on account of certain obstacles the work was postponed from year to year. In the latter part of 1915, it was, however, decided to start the work, beginning with the year 1916.

Various modifications of the original Wasser-

mann test, as devised by different workers, namely, the so-called New York or ice-box method, the methods used by the various hospital laboratories in this city, as well as in nearby city hospital laboratories, were tried out and a definite form was established, to which we have adhered with the exception of such modifications as described below.

Since January 1, 1916, free Wassermann tests have been offered by the Boston Health Department Laboratory as an additional routine examination, and during the year over 2500 of these tests were made, showing that this opportunity was thoroughly appreciated.

Specimens may be submitted by physicians in outfits provided by the laboratory, or the patients may be sent to the laboratory to have the specimens taken. The laboratory is prepared to receive these patients and to collect the specimens of blood from 2 to 4 p.m., only, on certain days of the week.

History blanks are mailed to physicians on request, and each patient appearing at the laboratory must present one of these, carefully filled out and signed by his attending physician. Specimens are not collected at any other time, nor are they collected from patients coming without carefully prepared history cards.

Reports upon the examinations are made to the physicians only.

Physicians who wish to collect the specimens themselves may obtain outfits at the laboratory, but are responsible for their careful return after the specimens have been taken.

Reports. The reaction as carried out in this laboratory has the following diagnostic significance: *Positive* indicates syphilis, except very rarely in acute febrile conditions, such as malaria and pneumonia. *Negative* does not exclude syphilis. In dealing with obscure conditions less than three negatives cannot be relied upon. *Doubtful* signifies an inconclusive result. It is advisable to submit several specimens in such a case, and to interpret a persistently or predominatingly doubtful reaction as indicative of a syphilitic infection. *Unsatisfactory* means that the test was unsuccessful either because of the condition of the specimen or on account of some difficulty with the technic. In the latter event the test is repeated on the next testing day, otherwise a new specimen is requested.

In addition to the above reports, as will be explained later, the laboratory has been sending out a few reports of "moderate positive," indicating an undoubted positive but of a less degree of intensity.

TECHNIC USED IN THE TEST.

Preparation and titration of reagents.

Antigens. Two antigens have been used, the first an alcoholic extract of human heart, cholesterinized, and the second an acetone insoluble antigen prepared from fresh beef heart by Noguchi's method.

The cholesterinized antigen is prepared according to the method of Swift and Ellis, as follows:

Put some fresh human heart, free from fat or fibrous tissue, through a meat grinder, and to 50 grams of this ground material in an Erlenmeyer flask add 500 c.c. of absolute alcohol and shake well. Cork and place in an incubator at 37° C. for two weeks, giving it a thorough shaking each day. At the end of two weeks' incubation the solution is filtered, the filtrate placed in the ice chest over night and again filtered. The filtrate is then kept closely stoppered in the ice chest and, as needed, is removed in quantities of 100 c.c. To this amount (100 c.c.) of the filtrate is added 4 gm. of Kahlbaum's cholesterol. This is shaken and then incubated at 37° C. for 24 hours, to dissolve the cholesterol. The antigen is now ready for titration and use. The cholesterinized antigen should be kept at room temperature as the cholesterol precipitates if kept in the cold. As needed for use it is diluted 1 part to 9 with normal salt solution, adding the salt solution slowly and with constant shaking. It is then titrated for exact strength, as described later.

The acetone insoluble antigen is prepared as follows:

Fifty grams of ground fresh beef heart free from fat or fibrous tissue are mixed in an Erlenmeyer flask with 500 c.c. of absolute alcohol, corked and put into an incubator at 37° C. for two weeks, shaking the mixture well each day. At the end of two weeks the preparation is filtered and the filtrate evaporated by the use of an electric fan. The residue is dissolved in about 25 c.c. of ether and allowed to stand in a cool place over night, covering the dish to prevent evaporation. The supernatant portion is then decanted into another receptacle and evaporated to a small volume (5 to 10 c.c.). This is then mixed with ten volumes of pure acetone. The precipitate which forms is allowed to settle and the supernatant liquid decanted.

The acetone insoluble portion is the antigen.

Each .3 gm. of this substance is dissolved in 1 c.c. of ether and 9 c.c. of pure methyl alcohol added. This stock solution is kept in the ice chest, and as needed for use is diluted 1 part to 14 with normal salt solution, adding the salt solution slowly with constant shaking. It is then titrated for exact strength as described later.

Amboceptor. Rabbits are injected with washed red corpuscles of the sheep made up to the original blood-volume with salt solution. Gradually increasing doses are injected intraperitoneally at about 3 to 4 days intervals, using injections of 7 c.c., 14 c.c., 21 c.c. and 28 c.c. Seven days after the last injection about 1 c.c. of blood is withdrawn from the ear vein and the serum titrated. If the serum shows a high titre 40 to 50 c.c. of blood may be withdrawn from the rabbit's heart with an ordinary antitoxin

syringe. In the hands of an experienced operator the rabbit suffers no ill effects from this operation and may be used again for amboceptor after a lapse of one or more months with but one or two additional injections of sheep's cells, as described above. The blood is allowed to stand for a few hours at room temperature for the formation of a good clot. It is then placed in the ice chest over night and on the following day the serum is separated. Precautions for asepsis should be observed throughout this whole procedure. The serum is placed in 1 c.c. glass ampules, sealed and inactivated in a water bath at 55° C. for 30 minutes on three successive days, after which it is kept in the ice chest and withdrawn as needed.

Complement. The complement used is fresh blood serum from guinea pigs. By withdrawing the blood from the heart, and allowing three or four weeks for recuperation, the pigs may be used over and over again. A fair sized pig should furnish about 8 c.c. of blood without being seriously injured. Before operating primary anesthesia is induced with the A. C. E. mixture.

The serum separates out better in petri dishes than in test tubes. The blood is preferably drawn on the afternoon before the serum is needed for the tests, allowed to stand an hour or so at room temperature and then placed in the ice chest over night. In the morning the serum is separated, diluted to 10% with normal salt solution and titrated.

The patient's blood is collected with aseptic precautions, from one of the veins in the bend of the elbow, preferably the median cephalic. It is well to draw from 5 c.c. to 10 c.c. in a sterile tube, after which the tube is slanted. A good separation of serum will be obtained if, after clotting, the clot is broken away from the sides of the tube. After standing an hour or two at room temperature, the blood is placed in the ice chest over night. In the morning the serum is withdrawn and centrifuged if cloudy. It is then inactivated by placing it in a water bath at 55° C. for 30 minutes.

Sheep's cells are obtained by washing fresh drawn, defibrinated, sheep's blood three times with normal salt solution by means of the centrifuge and diluting the final concentration of cells to 5% with salt solution. It is convenient to draw the sheep's blood and wash the corpuscles the night before they are to be used, keeping them in the ice box and diluting just prior to use.

Salt Solution is prepared by dissolving 8.5 grams of e.p. sodium chloride in a litre of distilled water and sterilizing in an Arnold sterilizer for at least one hour.

Pipettes. The following pipettes are used:

- 10.0 c.c. pipettes graduated into .10 c.c.
- 5.0 c.c. pipettes graduated into .10 c.c.
- 1.0 c.c. pipettes graduated into .10 c.c.
- .3 c.c. pipettes graduated into .01 c.c.

Directly after use each pipette is placed in normal salt solution.

After the tests are finished all the pipettes are rinsed with clean water and dried in the hot air oven.

Titration of the Amboceptor. To .1 c.c. of the undiluted amboceptor is added 9.9 c.c. of normal salt solution and the mixture is thoroughly shaken. This gives a dilution of 1-100.

To .1 c.c. of the 1-100 dilution is added .4 c.c. of normal salt solution, giving a dilution of 1-500.

To .1 c.c. of the 1-100 dilution is added .9 c.c. of normal salt solution, giving a dilution of 1-1000.

To .1 c.c. of the 1-100 dilution is added 1.4 c.c. of normal salt solution giving a dilution of 1-1500, and so on until dilutions up to 1-5000 are prepared.

Now a series of tubes is taken and in each one, marked with the dilution factor, is placed .5 c.c. of the correspondingly diluted amboceptor. To each tube is added .5 c.c. of 10% complement or if the complement has been titrated and its unit found, twice the unit may be used.

To each tube is added .5 c.c. of 5% sheep's corpuscles and a sufficient amount of the salt solution to bring the volume up to 2 c.c.

The contents of the tubes are thoroughly shaken and placed in a water bath for one hour at 37° C., at the end of which time the results are noted.

That amount of amboceptor that just completely hemolyzes the corpuscles is taken as the amboceptor unit.

Two units of amboceptor are used in the Wassermann test. It is convenient so to dilute the amboceptor that .5 c.c. of the dilution contains 2 units.

TITRATION OF THE ANTIGEN.

Hemolytic Titration. Increasing amounts of the diluted antigen are placed in a series of test tubes as follows: .03, .05, .08, .1, .15, .2, .25, .3 c.c. and salt solution is added to make up each tube to 1.5 c.c., after which .5 c.c. of sheep's cells is added to each tube, the tubes are thoroughly shaken and incubated in a water bath at 37° C. for one hour and readings made. As a rule the hemolytic titration is not absolutely necessary.

In calculating the dose of antigen to be used in the test, one fourth the amount not hemolytic is generally used.

Anticomplementary Titration. Antigen is used in the same amounts as in the hemolytic titration.

Complement is added .5 c.c. of the 10% solution to each tube.

Salt solution is now added to each tube to bring the contents up to 1 c.c.

The contents of the tubes are thoroughly shaken and they are incubated in the water bath at 37° C. for 40 minutes.

thoroughly by shaking the tubes; they are then incubated again for one hour at 37° C. and the results read.

It has been noticed that the cholesterinized antigen is a little too sensitive to be absolutely relied upon. It catches all the positives and also holds up with a few sera which show negative results with the use of other antigens.

With the acetone insoluble antigen a positive result at the end of the hour is to be relied upon, but the test may be negative when it should be positive, because the antigen is not sufficiently delicate.

During the first six months of our work we reported *positive* only on those cases where with both antigens there was no hemolysis; *negative* where both showed hemolysis and *doubtful* where the cholesterin antigen showed no hemolysis while there was hemolysis with the acetone insoluble antigen.

During the first six months' work 934 examinations were made and reports were given as shown in the following table:

	Pos.	NEG.	DOUBTFUL	UNREY.	TOTAL
January	9	33	4	0	46
February	27	67	9	3	106
March	37	117	15	2	171
April	36	126	14	1	177
May	50	162	13	3	228
June	47	145	12	2	206
TOTALS	206	650	67	11	934
	22+%	70—%	7+%	1+%	100%

Of the 11 unsatisfactory tests four were hemolyzed, four anticomplementary, two had insufficient material and one was a broken tube.

On 67 tests, or a little over 7%, "doubtful" reports were sent. The great majority of these cases gave a moderately positive reaction with the cholesterinized antigen, while the test with the acetone insoluble antigen showed a weak hold-up or was negative. The actual readings were as follows:

		w = weak			
Cholesterin	Acetone Insoluble	+	—	Cases	
+	+	—	—	10	"
"	m = moderate	+	—	34	"
+	m	—	—	6	"
"	w	+	—	4	"
+	w	—	—	2	"
Information not recorded		—	—	2	"
TOTAL				67	Cases

It is a matter of regret, when one considers the difficulty often experienced in obtaining these specimens, that such a high percentage of doubtful reports should be given. We do not know the experience of other laboratories, but we are inclined to believe our experience is not exceptional, and that any practical means whereby these "doubtful" returns may be reduced in number would be much appreciated.

We therefore began on July 1st to do further work with this class of specimens by repeating the test in such cases, using .4 c.c. of the patients' serum with the acetone insoluble antigen instead of .1 c.c. in order to increase the antibody content and also running a control with .4 c.c. of the serum, feeling that it was perfectly safe to report as moderately positive any case giving a strongly positive reaction with a negative control. If the reaction was negative or very weak with .4 c.c. serum and the acetone insoluble antigen, it was still reported doubtful.

The results are shown in the figures for the next six months.

DEATH SIX MONTHS.			MOD. POS. NEG.				
	Pos.	NEG.	DOUBT.	FORMERLY DOUBT.	UNREY.	TOTALS	
July	41	159	13	12	0	4	229
Aug.	48	187	13	15	0	3	266
Sept.	57	133	6	19	0	1	216
Oct.	76	167	6	10	6	4	269
Nov.	61	193	8	10	2	0	274
Dec.	87	226	12	17	0	1	343
TOTALS	370	1065	58	83	8	13*	1597
	23+%	66+%	3+%	5+%	1%	1—%	

Under our former method of reporting, 149, or a little over 9% of the total specimens, would have been reported "doubtful." The new method enabled us to report 91 of these either moderately positive or negative, and diminished our "doubtful" returns to 58, or a little over 3% of the total.

In the majority of the 149 cases, as originally tested with .1 c.c. of patients' serum, the cholesterin antigen was positive and the acetone insoluble negative or with but a slight reaction.

Results with .4 c.c. serum and acetone insoluble antigen were as follows:

	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTALS	REPORT
.4+	10	15	17	5	4	13	64	Mod. Pos.
m	2	0	2	5	6	4	19	Mod. Pos.
.4+	3	1	3	2	0	1	10	Doubtful
.4—	10	12	3	4	8	11	48	Doubtful
TOTALS	25	28	25	16	18	29	141	

In eight other cases there was but a weak hold-up with the cholesterin antigen and none with the acetone insoluble even when .4 c.c. serum was used. These were reported negative.

Beginning with the last of November, partly with these tests and partly with tests of the present year, we have made a further study of these doubtful cases by comparing the .4 c.c. method and the ice-box method, using the following technic for the ice-box tests.

Tubes, one for each test, were arranged in a rack, the blood serum to be tested, acetone in-

* Of the 13 unsatisfactory specimens, 7 were haemolysed, 2 anti-complementary and 4 insufficient in quantity to carry out the .4 c.c. test.

soluble antigen, and complement, in volumes as described above, were placed in the tubes, the contents well shaken, and the rack placed in the ice compartment of the ice chest for four hours. At the end of that time one c.c. of sensitized cells, prepared as described above, was added to each tube and the rack placed in the water bath kept at 37° C. and readings made at the end of one hour. With the above set was also run an antigen control tube which contained twice the volume of antigen used in the tests, but no blood serum. Some laboratories recommend that the readings recorded should be made just as soon as there is complete hemolysis in the antigen control tube, but we have found that such readings often lead to false positive results.

A series of 50 of these cases, with unsatisfactory reactions in the regular routine, has been made, with the following results:

37° C.						37° C.						Ice Box	
No.	.1 COLOR.	.1 ACET. ISOL.	.4 ACET. ISOL.	.1 ACET. ISOL.	Report	No.	.1 COLOR.	.1 ACET. ISOL.	.4 ACET. ISOL.	.1 ACET. ISOL.	Report		
2107	+	-	+	+	Pos. m	1	+	-	+	+	Pos. m		
2126	+	-	+	+	Pos. m	28	+	-	+	+	Pos. m		
2177	+	-	+	+	Pos. m	30	+	-	+	+	Pos. m		
2204	+	-	+	+	Pos. m	41	+	-	+	+	Neg.		
2205	+	-	+	+	Pos. m	79	+	-	+	+	Pos. m		
2215	+	+	+	+	Pos. m	147	+	-	+	+	Neg.		
2217	+	-	-	+	Doubt.	51	+	-	+	+	Pos. m		
2220	+	-	-	+	Doubt.	187	+	+	+	+	Pos. m		
2246	+	+	+	-	Pos. m	203	+	-	+	+	Pos. m		
2271	+	+	+	+	Pos. m	214	+	+	+	+	Pos. m		
2278	+	-	+	+	Pos. m	335	+	-	+	+	Pos. m		
2294	+	-	+	+	Neg.	427	+	-	+	+	Pos. m		
2297	+	-	+	-	Pos. m	429	+	-	+	+	Pos. m		
2330	+	-	+	+	Pos. m	497	+	-	+	+	Pos. m		
2343	+	-	+	+	Pos. m	536	+	+	+	+	Pos. m		
2351	+	-	+	+	Pos. m	545	+	-	+	+	Pos. m		
2392	+	-	+	+	Pos. m	580	+	-	+	+	Pos. m		
2399	+	+	+	+	Pos. m	587	+	-	+	-	Pos. m		
2401	+	+	+	+	Pos. m	806	+	+	+	+	Pos. m		
2403	+	+	+	+	Pos. m	626	+	-	+	+	Doubt.		
2410	+	+	+	+	Pos. m	646	+	+	+	+	Pos. m		
2417	+	-	+	-	Pos. m	652	+	-	+	+	Pos. m		
2423	+	+	+	+	Pos. m	680	+	-	+	+	Pos. m		
2433	+	+	+	+	Pos. m	773	+	+	+	+	Pos. m		
2438	+	-	+	+	Neg.	776	+	+	+	+	Pos. m		

Under our original plan of reports these 50 cases would all have been reported "doubtful."

Reports were made, however, on the outcome of the .4 c.c. tests, the ice-box method being run simply for experimental purposes. Forty-three were reported moderately positive, 4 negative, and but 3 doubtful.

Results of the two methods agree in 20 instances, in 16 tests the .4 c.c. and in 14 instances the ice-box method shows a stronger reaction.

If reports had been made with the results of the ice-box method rather than those of the .4 c.c. method, there would have been 40 moderate positives, 8 negatives and but 2 doubtful. In 37 instances the same report would have been given by either method, 36 moderately positive and one negative.

The comparison is very close, and it is difficult to say which is the more accurate. The .4 c.c. method has one advantage in that the test is much more quickly completed.

The three tests reported "doubtful" with the .4 c.c. method would have been reported positive" by the ice-box method. Seven reports of "moderately positive" with the .4 c.c. method were "negative" with the ice box.

It seems as though a consideration of these cases where results differ might give valuable information as to the comparative value of the tests. Unfortunately the histories furnished by physicians are rather inadequate upon which to base conclusions.

Case No.	Reactions with .4 c.c.	Reactions with Ice Box	Physician's Diagnosis	Treatment
2217	Doubtful	Positive	Syphilis	Neosalvarsan, 3 doses
2230	"	Mod. Pos.	Syphilis	None
626	"	Positive	Syphilis (2)	Salvarsan, 3 doses
2294	Negative	Positive	" (3)	Mercury pills, 9 mos.
147	"	Positive	Not given	None at present
2126	Mod. Pos.	Negative	Not given	For rheumatism
2246	"	"	Syphilis (3)	6 mos., mercury pills
2297	"	"	" (1)	Local
2343	"	"	"	6 doses salvarsan
2417	"	"	"	Mercury pills, 3 yrs.
30	"	"	" (3)	2-4 doses salvarsan
187	"	"	Not given	Not given
2438	Negative	Doubtful	Syphilis	4 doses neosalvarsan
			Not given	Not given

OTHER TESTS.

No.	DATE	RESULT
2239	12 14, '16	Mod. Pos.
626	1 18, '17	Positive
2297	1 24, '17	Doubtful
2343	4 17, '16	Mod. Pos.
587	11 2, '16	Positive

Numbers 2239 and 626 were positive on other tests as were also numbers 2343 and 587, while a second test on 2297, after intensive treatment, was doubtful. We thus have evidence from other tests that two of the three "doubtfuls" with the .4 c.c. method were positive and also that two of those negative with the ice-box method were positive.

There is no further evidence for the two negative with .4 c.c. and positive with the ice box.

On the whole, we are inclined to regard the .4 c.c. results as equally reliable if not slightly superior in delicacy of reaction to the results obtained by the ice-box method.

We have, therefore, adopted it as routine for all cases where there is a reaction with the cholerin antigen without corresponding effect with .1 acetone insoluble and have adopted the following table for a working basis.

CHOL. ANTIGEN	ACETONE INSO. ANTIGEN	REPORT
.1 pos.	.1 pos.	Positive
.1 pos.	.1 pos. mod.	Positive
.1 pos.	.1 pos. weak or neg.	To be run over with .4 c.c. serum
.1 pos.	.4 pos. or pos. mod.	Pos. mod.
.1 pos.	.4 pos. weak or neg.	Doubtful
.1 pos. mod.	.1 pos.	Positive
.1 pos. mod.	.1 pos. mod.	Pos. mod.
.1 pos. mod.	.1 pos. weak or neg.	Doubtful
.1 pos. mod.	.4 pos. or pos. mod.	Pos. mod.
.1 pos. weak	.1 pos.	Doubtful
.1 pos. weak	.1 pos. mod.	Doubtful
.1 pos. weak	.1 pos. or neg.	Doubtful
.1 pos. weak	.4 pos. or mod. pos.	Doubtful
.1 pos. weak	.4 pos. weak or neg.	Doubtful

We acknowledge the valuable assistance rendered by Mr. Aloy Soong, an assistant in the laboratory of the Boston Board of Health.

Society Report.

NEW ENGLAND PEDIATRIC SOCIETY.

THE forty-sixth meeting was held at the Boston Medical Library, January 26, 1917, at 8.15 p.m.; the President, Dr. Maynard Ladd of Boston, in the chair. The following papers were read:

1. President's Address, Health Insurance in Relation to Pediatrics, Maynard Ladd, M.D., Boston.
2. Congenital Malformations of the Lower Bowel, James S. Stone, M.D., Boston.

3. Congenital Heart Disease, Charles H. Dunn, M.D., Boston.

4. Are Carious Teeth an Etiological Factor in Heart Disease? E. W. Barron, M.D., Malden.

PRESIDENT'S ADDRESS.

Members of the New England Pediatric Society, Ladies and Gentlemen:

First of all, I wish to express my appreciation of the honor you have conferred upon me in electing me your presiding officer for the coming year. I hope that, with your hearty cooperation and support, the New England Pediatric Society may continue successfully to further the interests of pediatrics in this community.

There is at present, as you all know, a widespread and powerful movement to force, upon this and about twenty other states, medical insurance for workers earning less than \$1200 a year. As this proposed legislation seems likely to apply eventually not only to the wage-earner, but to his family as well, it is fitting that we should study carefully the relation which such insurance may have upon the practice of pediatrics, and the position which we, as pediatricists and as representatives of the staffs of hospitals for children, should take in reference to the proposed legislation.

The movement has acquired such momentum, and the arguments in favor of it, from the point of view of the wage-earners, are on the surface so plausible, that it seems more than likely that in this state at least, some sort of a bill will be passed eventually. Once upon the statutes, it will be difficult to make amendments to the law, and its major provisions, at least, will be foisted upon the community and the medical profession whether we like them or not.

No one, so far as I can see, has as yet claimed to have a vision of the future so prophetic as to give anything like a definite conception of the changes which will inevitably result in the practice of medicine. It is safe to say, however, that the present bill, if passed, will cause a tremendous upheaval in the relations of physicians to the public. It seems likely that public sentiment will support the idea. The public will not champion the cause of the medical profession against its own interests. On the other hand, physicians, as a whole, are likely to acquiesce and even further the movement if they are convinced it is in the interests of public health.

Arguments for and against the bill, to carry weight, must be based upon its effects upon the insured. Individual interests of physicians will be sacrificed if for the good of the people. This situation we may as well accept. It is, however, our right and duty to bring before the public our experience in handling the complicated problems connected with the public health, and to forecast, so far as possible, the extent to which the radical and socialistic measures provided in the act will benefit or injure the public. We have a right to influence the provisions of the bill in its formative stage, so that, if enacted, it may prove advantageous to both the public and the medical profession. The desire to enact such legislation is so keen on the part of those favoring it, that a strong presentation of the rights of the medical profession at this stage is likely to be heeded.

In the last four years the Social Service Department of the Boston Dispensary has investigated the economic condition of more than 75,000 persons applying for treatment. If the income of the work-

ing children is excluded, only 3.5 per cent. of the wage-earners had an income of over \$1000. In other hospitals there is probably a larger percentage of relatively well-to-do people treated, but no one would question the fact that for practical purposes nearly the whole clientele of the Boston hospitals for children would, by the passage of this insurance bill, become subject to the provisions of the act if families of the insured are to be included.

If the need has existed in the past, by which this immense population has been forced into hospital clinics to obtain the best of medical care in special lines, that same need will exist in the future, medical insurance or not. These patients come to specialists, partly because they cannot afford to employ us in a private capacity, and partly because the special skill and facilities for diagnosis and treatment cannot be obtained from the type of general practitioners who, undoubtedly, would be registered on the panel of physicians entitled to practice under the insurance act. It is difficult to foresee how the hospital staff as a whole could, with their arduous duties as teachers in medical schools and visiting physicians in house and out-patient clinics, find time to care for the insured class as panel physicians. If, then, the children of the insured continue to be treated as hospital patients, in what relation will the hospitals stand to the new insurance law? This is a question of very vital concern to all of us. If the hospitals as such should be enrolled on the panel, they should be entitled to remuneration for services performed, whether in the house or out-patient departments, just as the unattached physician will be. This would appear to render necessary contract service between hospitals and the carriers, which would place a considerable part of the hospital clinic upon a pay basis. Such contracts would probably bring in considerable incomes to offset the deficits which now make our hospitals a burden on the charitable public.

If the insurance commissioners enter into contracts with hospitals for the care of the children of wage-earners, it would seem reasonable to suppose that the remuneration would have to be at a much lower rate per visit than a private physician on the panel could afford to accept for his services. In a community like Greater Boston, therefore, would not the economic effect of such competition tend to increase greatly the size of the clinics at the expense of the general practitioner? As the staffs of specialist hospitals are necessarily limited, it is reasonable to suppose that these would gradually develop a hospital caste still more at variance with that portion of the profession which is not affiliated with hospitals than now is the case, with a chance for the injection of medical politics incompatible with the dignity of the profession or the ultimate interests of the public.

The proposed law would provide for supervision of all works performed by the insurance commissions, whether by panel physicians or contract hospitals. If, therefore, the major part of hospital practice is to consist of insured patients, the hospitals are at once brought under direct supervision by a state body, with all its concomitant possibilities of political activities, which would make present medical politics look like child's play in comparison. When the political game is played the public generally suffers. Is there anything in the present bill which guards against such an evil?

It would be a short-sighted and selfish position

for us to assume, because the majority of us here probably derive our income from patients earning more than \$1200 a year, that we need not be concerned with the outcome of this medical insurance act. Directly or indirectly, every man of us will feel its effect. The disturbing thought that no one can foresee the way in which it will work out, that the bill is framed with very little consideration for the experience or feelings of the medical profession, that there is not the slightest guarantee that the public will get better service than under the present constantly improving conditions of medical practice, make the subject one which, in my opinion, should be very thoroughly considered and discussed by every medical organization in the State.

Specific provision has been made in the insurance bill now before the legislature for the care of the families of wage-earners. This appears to be a logical sequence of the argument in favor of insuring the wage-earner, for the object of medical insurance is to prevent poverty and suffering on the part of the limited wage-earner and his family. To limit the benefit of the act to the wage-earner himself by no means insures the family against the devastating economical effects of illness. A wage-earner with a wife and four children, for instance, is more likely to suffer financially through the illness of the wife and children, than through failure of the health of the wage-earner, and if this social problem is to be solved by medical insurance, is it not of equal importance to include the family as well as the wage-earner himself? An act which protects the workers alone seems likely to fall short of the social need which underlies this sociological movement. If adopted at all, it would seem reasonable to provide for the larger requirements of family practice. If the present bill recognizes this need, the hospitals and dispensaries for children immediately come within the scope of the act, and careful consideration of the details of the law now is desirable.

The parts played by the children's hospitals and dispensaries, in proportion to the total of hospital practice, is very great. The burden of adequate maintenance and support for these institutions is enormous and is borne by a small proportion of the population. If this medical insurance is to become a part of our social organization, supported by the State, the employer and the wage-earner should similarly contribute to an insurance fund which should provide means for proper medical care of the wage-earner's family. As it is now, this burden is borne, for a very large portion of the community, by the hospitals alone, through private philanthropic support. The hospitals, under the proposed acts, may be entitled to compensation from the carriers for services rendered to insured wage-earners, and even though the rate of remuneration to be decided upon may be small, as compared with private fees, there is no doubt that the total amount received under the act might prove a considerable and thoroughly justified source of income to the hospital. There is nothing, however, in the act at present which makes compensation *mandatory*. This seems to me a serious defect from the hospital point of view. The wage-earner and his family may choose from the panel his choice of physicians. If hospitals are enrolled on the panel as organizations of specialists, it is reasonable to suppose that its present clientele will continue in large part to apply to them for medical services. If this service

is not by law entitled to just compensations, the carriers escape the responsibility of paying for services, for which they would be responsible if rendered by private panel physicians. The hold of our hospitals upon their patients depends more upon the advantages they offer for scientific diagnosis and specially skilled treatment than upon the fact that the treatment is free. Under the proposed legislation the insured would be entitled to free medical care under any circumstances. It is probable, therefore, that the same class of cases which is now appropriate to hospital care, whether in house or out-patient, will continue to apply for treatment. Unless the law makes compensation to the hospitals mandatory, it would seem as if the natural tendency of the carriers would be to shift as much work as possible upon the hospitals so as to reduce to the minimum their responsibility for sick benefits. The result of such a tendency would obviously be to make the hospitals an indirect and involuntary contributor to the insurance fund, instead of a just beneficiary for services rendered. In other words, the State, in its efforts to conserve the health of the children of the insured, would put itself in the position of forcing private philanthropy of the few who support the hospital, to assume the financial responsibility which in justice should fall upon the State, the employer and the wage-earner.

To compensate hospitals for services rendered at the request of the insured, would be equitable and just and on a plane with the tax which the public pays in support of its public school. It would ultimately place the hospitals upon a much sounder financial basis than they can ever obtain under the present system of private enterprise and philanthropy.

Any plea for mandatory compensation to hospitals for services rendered to the families of the insured, will be open to the same criticism and objections on the part of the medical profession which may be raised against the bill, **however worded or limited**. If, however, by force of circumstances and public opinion the State is determined upon the experiment so radical and socialistic as a medical insurance act, it must be framed in such a manner as to be consistent in theory and equitable in operation. The bill presupposes that the worker earning \$1200 or less cannot afford to suffer through illness the financial loss of his income, which admits no contrary argument. It also presupposes that when the wages continue to be paid by provisions of the act, the wage-earner is still unable to meet through his wage-benefit the expense of his medical care. It is equally logical to assume that he cannot afford to meet the expense of the still greater possibilities of poverty caused by illness in his family. If he cannot afford to meet the expense of his own illness, with wages continued, we must admit his inability to provide for proper medical care for his family.

It seems to me that the promoters of this bill have set the standard of the man who needs insurance to protect him against poverty much too high. There is much to be said against the arbitrary limit which has been placed at \$1200 a year. It is not clear that any distinction is made between the single man earning \$1200 a year and one with four or six dependents. There must be some wage so low that the margin of profit for the emergencies of illness would be so small that no private physician of any worth could afford to render medical services for the amount the wage-earner could pay.

Medical insurance for such a class would be a distinct advantage to the physician in general practice as well as the wage-earner. The point at which compulsory insurance should become operative is one which, I think, deserves more discussion than has been given it. Personally I believe that the proposed standard of \$1200 a year is so high, that it will work great injustice to a very large element in the medical profession, whereas, if the limit was materially lowered to a class which shows no profit to the private physician, a large part of the opposition to the bill would disappear.

Whatever the final decision in regard to this level of compulsory insurance may prove to be, the important point which I would emphasize is the fact that the present bill fails to safeguard the interests of the greatest of all organizations for preserving the public health, the incorporated hospitals which are independent of state and municipal aid. To my mind it is only reasonable and fair that compensation which they render to the insured and their families, should be mandatory and on such a scale that their efficiency may continue and grow so as to meet the ever-increasing demand upon their resources. The welfare and efficiency of the medical profession in the State is directly connected with the prosperity and efficiency of the hospitals. Both as private physicians and as staff physicians, it is our duty to consider with great care the effects upon the hospitals of legislation so radical and revolutionary as the proposed medical insurance act.

CONGENITAL MALFORMATIONS OF THE LOWER BOWEL.

By JAMES S. STONE, M.D., BOSTON,
Surgeon to The Children's Hospital.

THE records of about sixty cases of congenital malformation of the lower bowel seen at the Children's Hospital show certain facts.

The Children's Hospital treats about as many cases of atresia of the anus associated with some abnormal fistulous opening of the bowel as it does cases of complete imperforation.

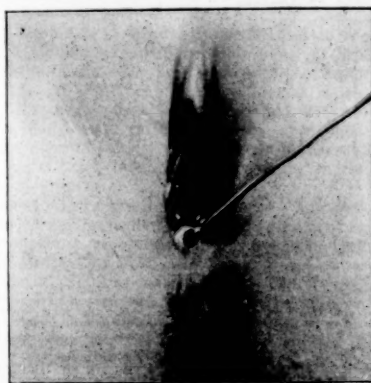
I do not believe this represents the real frequency of occurrence. A complete imperforate anus or rectum causes death within a few days unless relieved by surgical intervention. Many babies thus are either cured or die without ever coming to a hospital. The cases in which there is an abnormal opening of the bowel live, and in time are brought into the larger hospitals because the conditions are puzzling.

The babies brought in with atresia of the anus or rectum present a great variety of conditions. In some there is no evidence at all of any anus, the blind end of the bowel lies well above the brim of the pelvis. In others there is only a relatively thin membrane separating the bowel above from the normal anus below. Between these two extremes there is every intermediate gradation.

Partial occlusion of the rectum by a congenital membrane is occasionally seen. The finger pushed through the membrane in one such case in a baby about four months old, cured the constipation so promptly and so effectively that the opposite wall of the room did not escape.

One of the most persistent cases of stricture of the rectum occurred in a baby first seen when 48 hours old. A few hours before a complete membranous obstruction had broken through spontaneously. At that time nothing abnormal could be felt in the rectum. But for over a year this child needed constantly repeated dilatation of the cicatricial stricture which resulted about three-quarters of an inch inside the anus.

Cases of atresia of the anus associated with rectal fistulae of various forms, which are rarely seen in the practice of any individual, come often to the Hospital. The first child with this condition was a girl of five years. There had been no urgent symptoms until she ate a number of cherries, stones and all. The stones had to be pushed along manually through the fistulous tract which led from the rectum and the opening just behind the vagina.



ATRESIA OF THE ANUS WITH RECTO-PERINEAL FISTULA.

The dimpling and pigmentation of the skin at the normal location of the anus are well shown. An ordinary silver probe is introduced into the congenital fistula, which extends back to the rectum. The patulous opening of the vagina, the absence of the fourchette, and the rounding of the anterior edge of the perineum are well shown. This case is typical of the many in which the opening is in the anterior part of the perineum.

Since then many female babies have been brought in with fistulae opening at the anterior edge of the perineum or in the lower posterior vaginal wall. This condition is one which does not necessarily interfere with life if left absolutely alone.

A few years ago a patient presented herself at the Boston Lying-in Hospital, with the rectal opening well up on the posterior vaginal wall.

Many such anomalies are recorded among women, some of whom have been really more or less ignorant of the extent of their deformities. There have been no urgent symptoms, their mothers have said nothing to them about the deformity, and the girls have grown up in more or less ignorance of the fact that they were not entirely normal. Marriage and childbirth

have followed,—the true condition being discovered by the physician delivering them.

A number of male babies have been brought into the Hospital because of the passage of feces through the penis. In some cases these babies have presented urgent symptoms of obstruction of the bowel. In one such instance the child was brought in when twenty-one days old. During that time all meconium feces and gas had been passed through the penis. There was absolutely no anal opening. In other cases there has been a fistulous opening in the perineum close behind the scrotum.



ATRESIA OF THE ANUS WITH RECTO-PERINEAL FISTULA.

The long congenital fistula leads back to the rectum at the side of the irregular raphe of the perineum. Posteriorly the puckering of the skin is seen at the normal location of the anus. This illustrates the type often seen in boys.

In order to understand the congenital malformations of the lower bowel, certain embryological facts must be kept in mind. These I will state in a very general way.

The anus develops in the following manner: The anal membrane, formed by the growing together of the ectoderm and entoderm and the pushing aside of the mesoderm, appears in the third week of fetal life. During the following fortnight this membrane becomes depressed to form the anal pit. Meantime the allantois grows out as a diverticulum from the ventral wall of the gut. A part of this later forms the urachus, a part of the urinary bladder, while the short, wide portion nearest the bowel is called the urogenital sinus. Into this empty the Wolffian ducts, the ducts of Müller, and, secondarily, the ureters. The lowest part of the gut nearest the urogenital sinus, is the cloaca, the common termination of the genitourinary system and of the intestinal canal. The anal pit is formed directly opposite the cloaca. In man the cloaca becomes divided into a ventral passage, the true urogenital sinus, and a dorsal canal, the rectum. The partition which sepa-

rates these two passages, and which ultimately becomes the perineum, is formed by the growth of three ridges or folds, one pushing down from above from the junction of the urogenital sinus and the gut, the other two growing inward, one from each lateral wall of the cloaca. The anal pit shares in this division, the posterior part remaining the anal pit proper, the anterior part forming the orifice of the urogenital sinus. The division is complete by the fourteenth week of fetal life. The anal pit deepens, the anal membrane being thereby approximated to the end of the bowel. In the fourth month the anal membrane breaks down and disappears, leaving the lower end of the intestinal canal patent.

Owing to defects in development, occurring in early fetal life, four distinct types of congenital abnormality of the anus and rectum are recognized.

In the first type the anal pit or depression is not formed as is normal. There is then an absence of the anus. In the second type of cases the anal membrane persists. There is then no connection between the bowel and the anus. There is an imperforate anus or rectum. A similar condition may also be due to defective development of the rectum itself. In the third type the anal membrane disappears only in part.



DIAGRAM 1. shows the development opposite the anal pit (A.P.) of the cloaca (C) at the lower end of the intestine (R) into which empty also the primitive Wolffian duct (WD) and the duct of Müller (MD), and from which the allantois leads out to the umbilicus.

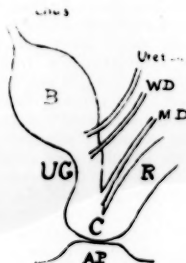


DIAGRAM 2. shows the differentiation of the allantois into three portions: the urachus, the bladder (B) and the urogenital sinus. The beginning division of the cloaca into an anterior and a posterior portion is also indicated.



DIAGRAM 3. shows the further development in the male, the Wolffian duct (WD) becoming the vas deferens, and the duct of Müller becoming the insignificant sinus pularis (SP) or uterus masculinus.

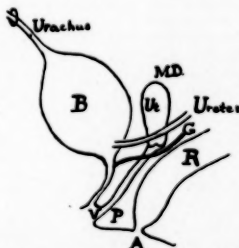


DIAGRAM 4. shows the corresponding development in the female. The Wolffian duct becomes the insignificant canal of Gartner, while the duct of Müller (MD) becomes subdivided into the vagina, uterus and Fallopian tube.

In each of the last two diagrams the development of the perineum is complete. By growth downward from the point between the duct of Müller and the rectum and by growth inward from the two sides, the perineum (P) is formed.

There is then a congenital stricture of the rectum. In the fourth type the partition between the urogenital sinus and the rectum does not develop normally. In certain cases the fold which should grow downward from the junction of the urogenital sinus and gut to unite with the folds pushing in from the sides, may be defective. Under these circumstances there remains a communication between the rectum and the bladder or urethra in the male, or between the rectum and vagina in the female. These malformations are usually associated with imperforate anus. They are not the result of the imperforate anus, because the sputum, which divides the rectum from the urogenital sinus, is normally complete before the anal membrane disappears. It is perfectly possible that the failure of the anal membrane to disappear may be due to the fact that an abnormal communication persists, giving an exit from the rectum. Presumably, after the disappearance of the anal membrane any abnormal communication between the rectum and the bladder or vagina would tend to close spontaneously. In other cases the fold growing from above develops normally, while the folds from either side of the cloaca may

unite irregularly or incompletely. The true anus does not develop. The abnormal fistulous opening in the anterior perineum implies a lack of development of the anal pit associated with a partial failure of union between the sides of the perineum. The location of the abnormal opening of the rectum is presumably determined in good part by the development of that portion of the perineum which grows down from above. Thus, as just stated, when this portion is markedly undeveloped, the bowel opens into the bladder in the male or into the upper vagina in the female. If the abnormality is due to defective fusion of the three parts of the perineum, the upper and the two lateral, then the opening of the rectum is lower down, either in the lower vagina or in the perineum, or, in the male, in the urethra.

The abnormality is seen more commonly in the female than in the male. This may be due in part to the fact that in the female the duct of Müller which develops, is differently situated from the duct of Wolff, which in the male develops into the vas deferens,—the duct of Müller remaining undeveloped. In the male the abnormal opening, if external, may be situated anywhere in the median line of the perineum or scrotum, in the peno-scrotal angle, or the under surface of the penis; or if internal, at any point in the bladder or urethra.

Among the reported cases in males, however, the most common point of external opening is in the anterior part of the perineum, at the base of the scrotum, or in the scrotum or peno-scrotal angle, while the internal opening is usually into the bladder, much more rarely into the urethra, near the peno-scrotal angle. In females, the most common point of opening externally is at the posterior edge of the vulvo-vaginal orifice. Internally, the opening may lead into the vagina. The interposition of the vagina prevents an opening into the bladder or urethra in the female.

The accompanying diagrams may give a clearer idea of the conditions. They are taken largely from Heisler's "Embryology."

The most common location of the opening is thus in the anterior part of the perineum in both sexes. Presumably the fistula is situated most frequently along the line of junction of the three component parts of the perineal body. The frequency of the types of malformation among reported cases undoubtedly depends chiefly on the risk to life of the various forms.

In certain cases, while the anus is normal, the development of the partition between the gut and the urogenital sinus may be imperfect. This condition is more common in the female than in the male. In this manner are to be explained the valve-like openings which have been reported connecting the rectum and vagina. In the same way, perhaps, may be explained the cases of rupture of the posterior vaginal wall into the rectum, resulting from what must be

under normal conditions insufficient trauma to account for such an accident.

The symptoms vary greatly with the age of the child. In young babies the malformation is not apt to give rise to serious trouble because of the soft character of the feces. In older children, as the movements become more solid the difficulty of defecation increases. Dilatation of the bowel above is apt to occur, and, of course, more serious complications may arise. The chief dangers are obstruction of the narrow outlet by some foreign body or particularly hard fecal mass. In those cases in which the bowel communicates with the bladder or urethra, the dangers of urinary obstruction or infection are always present.

Cases in which there is no opening of the bowel, demand immediate operation. The perineal route should be chosen in all cases in which distinct bulging of the lower bowel can be felt below. The one essential point in the operation is to secure firm hold of the lower bowel and sufficient mobilization of the lower bowel before it is opened. Unless these precautions are taken, the minute the distended bowel is opened it at once collapses and recedes, and all the tissues are completely smeared and rendered unrecognizable by the thick mass of meconium which escapes. In cases in which no bulging mass of bowel can be felt in the perineum or with the finger inserted in the anus, it is far wiser to open the abdomen above. In many cases the blind end of the bowel lies free within the abdomen and sufficiently movable to allow it to be brought down easily to the anus, even when any attempt to reach it from below would be entirely vain. In other cases where the rectum is more fixed, there may be a gap in the bowel so wide that it is impossible to reach the blind end from below, or even at the first operation to push the blind end down from above. Under these conditions, the sole resort must be a colostomy.

In other cases still, in addition to the malformation in the rectum, there may be congenital occlusions higher up in the bowel. In some of these cases an anastomosis will give a chance of cure. In other cases, a large portion of the bowel is defective. I have seen a number of cases in which the esophagus, stomach, duodenum, and a couple of loops of jejunum are perfectly normal, and in which the rest of the small intestine, appendix, and all of the large intestine, down to the rectum, exist in miniature. The extent of this rudimentary condition of the bowel varies considerably, but where it exists, the lack of development is usually so great as to render life absolutely impossible. There is not enough bowel from which absorption of food can take place. In the less extreme cases an anastomosis may be performed. In most cases, even if successful, this would merely substitute death by starvation for death by obstruction. The need of primary abdominal operation cannot be urged too strongly in the cases in which distinct



CASE OF ATRESIA OF THE ANUS.

Recto-vesical fistula. Complete absence of the penis. There was a needle-point opening in the perineum through which a few drops of urine escaped. The puckering of the skin is seen at the normal location of the anus. This illustrates an extremely rare combination of anomalies.

bulging in the perineum cannot be felt. The children, at best, are weak, are suffering from intestinal obstruction, and many of them may have other malformations. The factors of loss of time, of hemorrhage, of shock, and of added risk of sepsis, are usually enough to turn the scale against the child in cases in which a primary abdominal operation might have been successful. The risk of wounding the bladder in these cases is very great unless the rectum can be easily felt.

Cases in which, in the male, there is an opening between the bowel and the bladder or urethra are not as extremely urgent as are the cases of complete obstruction. Boys have been brought into the hospital, three weeks old, where all the feces and all the urine were passed through the urethra. Of course this condition cannot go on indefinitely. Sooner or later feces will enter the urethra, become caught there, and then there will be not only obstruction of the bowel, but obstruction to the passage of urine.

In girls, where there is a fistulous opening into the vagina, there is no great urgency for surgical intervention. During the early months of life, while the feces are soft, they are passed readily through the fistula. It is only when they become formed and abnormally hard that there is any tendency to intestinal obstruction. Under these conditions an impacted fecal mass will be formed in the lower bowel, and around this mass a certain amount of soft liquid feces and mucus will pass. Under these conditions it is common to find the bowels moving with undue frequency, but in small amount. At the same time, the constitutional symptoms of chronic obstruction are slowly developing. Surgical intervention should be postponed in these cases as long as the bowels move normally through the fistulous tract without the retention of any fecal matter above. The surgical treatment, then,

must aim at the removal of the fistulous opening, the displacement backward of the bowel to its normal location, and the closure of the perineum, from which the fistula and bowel have been removed. The difficulties of operation are considerable. In the female especially, the partition between the rectum and vagina is usually unduly thin, and the rectum has a course more nearly vertical than normal. The utmost care must be taken when separating the posterior vaginal wall from the anterior rectal wall, not to perforate either mucous membrane. It is absolutely essential that the whole lower rectum be completely mobilized. It must be dissected free for a sufficient distance upward, to allow it to be displaced to its normal position backward and held there without the slightest tension. It is perfectly certain that some sepsis will occur. In an adult it is possible to prevent a movement of the bowels for a number of days, allowing sufficient time for any perineal wound to heal. In children, this is absolutely out of the question. Because of the chance of infection and the amount of ooze of blood and serum from the wounded surfaces, a small rubber dam drain for a day or two is desirable.

In all cases in which there is a puckering of the skin at the normal location of the anus, a sphincter muscle is present. It is important to save this if possible. Of course it must be cut across, but if the incision is made from the middle of the dimpled area directly backward in the median line, no great damage is done. This holds true in operations for complete imperforation as well as in cases in which the rectum is to be transposed to its normal position, in cases with perineal fistula.

In some cases it has seemed wise, on account of the condition of the child, not to attempt at first any radical reposition of the lower rectum, but simply the formation of a new opening between the rectum and the normal anus. Under these conditions the fistulous opening remains. It may empty into the perineum, or the urethra or bladder, or the vagina. Under these conditions, most of the feces may be passed through the new opening made at the location of the normal anus, but in a number of such cases, especially in boys, the small opening between the urethra and the rectum has remained patent, allowing the passage of a small amount of urine into the rectum, and at times allowing the feces to pass into the urethra.

The risk from the passage of feces into the urethra is very decided. Not only is there the danger of cystitis and consequent pyelitis, but there is also the risk of obstruction of the urethra, which in one case of a boy three years old led to a rupture of the urethra and extravasation of urine.

The question will naturally arise as to the advisability of a temporary colostomy in these cases, while the operative wounds made below

are allowed to heal. In older children this may be wise. In infants colostomy involves very serious risks. Prolapse of the bowel through the wound is common. Infection of the intestinal tract may occur.

As to after-care, a warning should be spoken. Our statistics show a very considerable ultimate mortality of atresia of the anus. In this mortality, various factors must be considered. Many children have, in addition to the malformation of the anus, other congenital troubles, perhaps congenital heart trouble, which may weaken them.



ATRESIA OF ANUS.

Recto-perineal fistula. Complete exstrophy of bladder and epispadias. Double inguinal hernia. A combination of malformations which is fortunately rare. It is noteworthy that the mother of this boy had later a baby with spina bifida, but that this baby was by her second husband.

Recurring stricture of the rectum with chronic intestinal obstruction often comes on so insidiously as to be neglected.

Infection of the intestinal tract as well as infection of the urinary passages are ~~to be~~ considered and guarded against.

The necessity of skilled after-care for many months cannot be emphasized too strongly.

DISCUSSION

DR. MIXTER: Dr. Stone has asked me to say a little something about exstrophy as one of the congenital malformations of the bladder which we meet with at the Children's Hospital. I think this malformation can best be imagined by introducing a knife at the meatus, passing it through the urethra to the bladder and along the urachus to the umbilicus. If, now, the incision is carried forward and all the structures anteriorly are divided, the condition represents a complete exstrophy—epispadias is always present, the symphysis is divided and the ends separated, the posterior bladder wall extrudes, revealing the uterus at the lower portion and the divided umbilicus forms the upper margin. Double inguinal herniae are present.

The question as to what a physician should say

when a case of exstrophy is brought to him is to me a very puzzling one. It luckily is of rare occurrence, about once in 50,000 children, but the mortality of the untreated cases is very high. It is estimated that 90% die in infancy or early childhood, and when the rare case grows to adult life, existence is perfect misery with the constant dribbling of urine, tenderness of the bladder, etc. On the other hand, what has operation to offer? In any operative procedure, to be satisfactory, you have to obtain some kind of sphincteric action for the control of the incontinence. That gives a fundamental objection to all the plastic operations on the bladder itself. On the other hand, the transplantation operations to introduce the ureters into the intestine is followed by a very high mortality, from anuria and from pyelonephritis. We have had eight cases, I think, at the Children's Hospital, and the infants that Dr. Stone reported the other day, and of those cases four died within several weeks after operation; three died before the end of the year, and only one is at present alive, seventeen months after operation. This child was a case I operated on a year ago last September. Last April I saw the youngster, and up to that time he had been fairly well.

Then he developed a very severe pyelonephritis with a large amount of blood in the urine passed by rectum and his general appearance indicated a rapidly fatal termination. He weathered that attack however, and at the present time is in good shape. It is possible that he will have another attack of pyelonephritis in the future and it is still impossible to foretell the ultimate outcome.

It is probable that in the future we can decrease the very high mortality. Dr. Cabot has suggested the use of vaccines in immunizing prostatic patients before operation to lessen the chance of pyelonephritis. This procedure might be found applicable before transplantation in exstrophy. A two-stage operation has been suggested,—first implanting the right ureter, for example, into the caecum and later the left into the sigmoid. It may even be found that the insertion of the ureters into the small intestine fairly high up where the tract contains fewer organisms, is feasible.

Even with the high mortality of the transplantation operation it seems to me no greater than the mortality you are bound to have if you leave the cases untreated: I think that it is at the present time the only satisfactory operation in certain cases. If you leave the children alone and they do grow up they are in perfect misery. If you operate on them they are pretty comfortable, as is this youngster that I spoke of. He is at present voiding by rectum 4 or 5 times a day and he gets up about once in the night. I think that the time preferable for an operation would be somewhere between three and four years, before the children go to school where they prove very objectionable to their associates. I believe that as a preliminary measure it would be well in cases in which there is definite separation of the symphysis that some orthopedic appliance should be used to bring the pubic bones together.

DR. STONE (in closing): The only thing to add is that many cases of imperforate anus have a communication between the bladder and the rectum which the physician or surgeon is apt to attribute to some mistake in operative technic. It should be clearly

understood that while this may be the case, in the majority of instances the communication is but a part of the congenital defect.

ABSTRACT OF PAPER ON A CASE OF CONGENITAL CARDIAC DISEASE.

By Charles Hunter Dunn, M.D., Boston.

The clinical report was that of a case in which the diagnosis of congenital cardiac disease was obvious from the physical examination of the heart. The presence of a palpable systolic thrill, of persistent cyanosis, and of cardiac enlargement, suggested the presence of pulmonary stenosis. The fact that the child survived for fifteen months suggested the presence of some additional compensating lesions, either defective interventricular septum, or open ductus arteriosus. The absence of a humming-top murmur, or the transmission of the murmur into the vessels of the neck suggested that the additional lesion was defective interventricular septum rather than open ductus arteriosus. The characteristics of the temperature chart, the positive von Pirquet reaction, and the presence of the palpable mass in the intestine suggested the diagnosis of chronic tuberculosis with a primary lesion in the intestine, and involvement of the mesenteric lymph-nodes, with the additional possibility of tuberculous peritonitis. The clinical diagnosis, therefore, was as follows:

- Pulmonary stenosis.
- Defective interventricular septum.
- Chronic intestinal tuberculosis.
- Chronic tuberculosis of the mesenteric lymph-nodes.
- Possible tuberculous peritonitis.
- Rickets.
- Terminal bronchopneumonia.

At autopsy the heart showed very marked enlargement. The point of origin of the aorta and pulmonary arteries, respectively, were reversed, the aorta arising in front and to the right, and the pulmonary artery behind and to the left. The foramen ovale was entirely open. The tricuspid and mitral valves were normal except for the widening of the orifices produced by the dilatation of the ventricles. There was some hypertrophy of the wall of the left ventricle, and marked dilatation of the cavity of the right ventricle without notable hypertrophy of the walls. The aortic orifice was situated, not in the left ventricle, but in the right ventricle somewhat further forward than the normal position of the pulmonary orifice. It was otherwise normal. The pulmonary orifice was situated in the left ventricle in the position normally occupied by the aortic orifice. It showed marked stenosis. There was an oval opening in the ventricular septum, 5 cm. in diameter, situated in the usual position of the lesion, namely, just below the normal position of the aortic orifice.

The principal interest in this case lies in the transposition of the great vessels, which is a comparatively uncommon lesion in congenital cardiac disease. There are two forms of transposition of the great vessels. In one form the aorta arises in front and to the right, while the pulmonary artery arises behind and to the left, but nevertheless, each vessel opens from its proper ventricle, the aorta from the left ventricle, and the pulmonary artery

from the right ventricle. This form is called corrected transposition.

In the other form, not only is the position of origin of the great vessels reversed, but the aorta opens from the right ventricle, and the pulmonary artery from the left ventricle. This is called complete transposition, and is the form which we have here. Complete transposition of the great vessels is a comparatively rare lesion in congenital cardiac disease. In most of the reported cases the lesion has been accompanied by other lesions, particularly by pulmonary stenosis and defective interventricular septum, as in this case. When this combination occurs, the diagnosis of complete transposition is impossible, the only physical signs being those of the accompanying additional lesions. There are a few reported cases in which the complete transposition was the sole lesion. In these cases the only clinical manifestation was persistent cyanosis, there being no murmur and no notable cardiac enlargement.

The most plausible explanation of the lesion is that of Rokitsansky. In the conus arteriosus which forms the upper part of the primitive aorta, the formation of the transverse aortic septum places the lumen of the aorta in front. The torsion which brings the opening of the aorta behind is due to a kinking in the bulbus cordis, which forms the lower part of the primitive aorta and pulmonary artery. This torsion is represented by the spiral arrangement of the septum in the bulbus cordis. If this normal kinking and torsion does not occur, or is slightly reversed, the aorta will arise in front and to the right, the pulmonary artery behind and to the left. In the first form of transposition there is a sympathetic adjustment of the interventricular septum in its union with the aorta-pulmonary septum, which causes each great vessel to open into its proper ventricle. This form is called by Rokitsansky "corrected" transposition. In the second form the interventricular septum unites with the malposed aorta-pulmonary septum without sympathetic adjustment, causing the aorta to open from the right ventricle and the pulmonary artery from the left ventricle. This is called "complete" transposition.

The remarkable feature of this case is that the child should have lived so long, especially with the additional handicap of chronic abdominal tuberculosis. The transposition of the great vessels must produce a very serious disturbance of the circulation. The venous blood returning to the right side of the heart from the venae cavae is sent right out again through the aorta, while the aerated blood returning to the left side of the heart from the lungs is sent out again through the stenosed pulmonary artery. The only way in which any venous blood can be aerated is by passing through the open foramen ovale, or open ventricular septum into the left side of the heart, often being sent out through the narrowed lumen of the pulmonary artery. With lesions of this extent, it seems quite remarkable that the patient should have attained the age of fifteen months.

ARE CARIOUS TEETH A CAUSATIVE FACTOR IN ENDOCARDITIS?

By Elmer W. Barron, M.D., Boston, Mass.

This paper is a summary of the study of the recorded physical examinations and personal histories

of 218 children operated upon for either tonsils or adenoids or both at the Forsyth Dental Infirmary during the past few months. The examinations are routine previous to the administration of anesthetics, but the attempt has been made to make them as thorough and complete as possible.* The histories have been taken with considerable detail.

The statistics here presented are intended as a preliminary report of some of the work now being done at the Forsyth, and I have no intention of answering the question which is the title of this paper, nor shall I make any attempt to draw conclusions.

Furthermore, I shall make no attempt to prove that a certain per cent. of these children had heart lesions, and no data for that purpose will be given. The results of the examination simply represent the opinion of the examiners, at one examination, that such lesions existed, and no case has been included except those thought definitely to present sufficient evidence of organic lesions.

In working out a form to be used in obtaining the histories, pains were taken to include every disease which could be found given as an etiological factor of endocarditis in the works of several different authors. Nowhere did I find any mention of carious teeth, as such, unless they be included under the general statement with which nearly every list is concluded, "that pyaemic and septic conditions may be the cause of endocarditis." That carious teeth may furnish a primary source of infection in some cases of tonsillitis and rheumatic fever, to which endocardial lesions are obviously secondary, is a phase of the question, impossible of proof, but not to be forgotten.

It is to be remembered that none of these children were operated upon because of any abnormalities, found at their examinations, or because of their past histories, but only for dental or nasopharyngeal indications, so that they are in no sense selected cases, from the point of view of the internist.

There have been no pathological examinations of any of the tonsils after removal. When they have been found to be obviously diseased a history of tonsillitis has usually been obtained.

Of the 218 children, 51, or 23%, were found to have endocardial lesions. There were incomplete records in five instances, two with heart lesions and three without, and these cases were excluded, so that the corrected figures still give 23%.

Table I shows the number of illnesses from which a heart lesion might have been acquired with which these 49 children had suffered; growing pains, so called, are included under rheumatic fever, and under gripe has been placed one child from whom was obtained a story of a "very severe cold" lasting a considerable length of time.

Table II shows the total number of carious teeth each child had, the total extractions (badly carious) and the total number of cavities filled (not badly carious).

Measles is said to cause endocarditis only very rarely; pertussis and mumps I was unable to find mentioned in any text-book specifically as causes, except that they might be included under a general statement that any infection may be a causative factor; and pleurisy with effusion is certainly rarely followed by endocarditis. Chicken pox is mentioned by a few authors.

There are 17 of the 49 who had no disease so far as could be ascertained or only one or more of those diseases just mentioned, and in Table III will be found a tabulation of them with the number of teeth extracted, filled and total carious. Seven of the seventeen, (Nos. 17, 20, 23, 25, 26, 27 and 35) had ten or more carious teeth, two (Nos. 7 and 29) had nine; two (Nos. 38 and 40) had eight; one (No. 44) six; two (Nos. 30 and 42) five; one (No. 49) four, and one (No. 48) had but one.

Three of the children (Nos. 23, 48, 49) had had no illness, of whom one (No. 48) had but one carious tooth; one (No. 49) had four extractions, and one (No. 23) had twelve carious teeth of which three were extracted. Six had had measles only; one (No. 25) had four extractions and eight fillings; two (Nos. 17, 26) had four extractions and six fillings; one (No. 29) had one extraction and eight fillings; one (No. 7) had nine fillings, and one (No. 30) had one extraction and four fillings. One child (No. 27) had had chicken pox only, but twenty-two carious teeth, of which it was necessary to extract eleven; one (No. 38) had had mumps only, with eight carious teeth, six of which were extracted. One (No. 20) had had measles and pleurisy with effusion, but had sixteen carious teeth, fifteen of which were filled. Number 35 gave a history of measles, chicken pox, pertussis and mumps, but she also had sixteen carious teeth, of which ten were extracted. Number 40 had had chicken pox, pertussis and mumps with eight carious teeth, five being extracted. Number 42, measles, pertussis and mumps, with five carious teeth, two being extracted and three filled. Two children (Nos. 44, 47) had measles and pertussis, the former with three extractions and fillings, and the latter five extractions.

I hope at a later date to present a larger number of cases with more complete data.

DISCUSSION.

DR. EUSTIS: I am very much surprised at the small number of cases that give a history of rheumatism and chorea. I have no figures to compare with Dr. Barron's, but my general impression obtained from seeing the cases of heart disease at the Children's Room at the Massachusetts General Hospital, is that a greater proportion of them give a definite history of some rheumatic affection in the past. I have seen a few cases where I have been able to find no other etiological factor than badly carious teeth. I am not prepared to say though, that the teeth are the cause of the endocarditis. I think another source of error in drawing any conclusions is the great difficulty in determining whether or not a given heart has a mild degree of endocarditis, or merely has a functional murmur or some slight functional irregularity. I should like to ask Dr. Barron what his criteria were in determining whether or not a case was one of endocarditis or merely had a functional heart murmur. I have had the greatest difficulty myself in doing so, and have put myself down in black and white, only to find myself wrong a few months later. With a single examination in many cases, it is nearly impossible to determine just what the condition is.

DR. DUNN: I must confess that I have been very much impressed by all this work of Rosenow on the infections so that personally I have become rather enthusiastic. If his views about the infections

* The examinations were made by the writer and Dr. Edward Martin, to whom I feel greatly indebted.

definitely, as we have a tremendous number of children to draw from at the Forsyth Dental Infirmary. It does not seem to me that the statistics given on these charts prove anything at all. They simply suggest the possibility that carious teeth may have been the etiologic factor in some cases.

PLYMOUTH DISTRICT MEDICAL SOCIETY.

The annual meeting of the Plymouth District Medical Society was held at 11 a. m. on Thursday, April 19, 1917, at Brockton, Mass. After the discussion of important matters the following officers were elected for the ensuing year: President, Nathaniel K. Noyes of Duxbury; Vice-President, Gilman Osgood, of Rockland; Secretary and Treasurer, Alfred C. Smith, of Brockton; Reporter, Alfred C. Smith, of Brockton; Commissioner of Trials, Francis J. Hanley, of Whitman; Censors: Fred J. Ripley, Supervisor; Walter W. Fullerton; James H. Drohan; Joseph Frame; Richard B. Rand; Councillors: A. Elliot Paine, Nominating; Frank G. Wheatley, Alternate; Gilman Osgood; Alfred A. MacKeen; Fred J. Ripley; Orator for 1918: Frank E. Wheatley, of No. Abington.

The annual oration for 1917 was delivered by Dr. Nathaniel W. Faxon of Stoughton, Mass.* Luncheon was served at the close of the meeting.

Book Reviews.

Anatomical Names. By ALBERT CHAUNCEY EYCLESHYMER, B.S., Ph.D., M.D., Head of the Department of Anatomy, University of Illinois; assisted by DANIEL MARTIN SCHOE-MAKER, B.S., M.D., Professor of Anatomy, St. Louis University. New York: William Wood and Company. 1917.

Those who are familiar with the author's unique atlas of frozen sections will welcome his latest contribution to the science of anatomy. This volume is a historical study of anatomic nomenclature, with especial reference to the Basle *Nomina Anatomica*. In his preface he sketches this history, and outlines the work of the commission of the German Anatomic Society, to whom we owe the Basle nomenclature. The book consists first of a translation of the original report of this Commission, written by Dr. William Hiss, with the tabulated names of the new terminology, and an appended explanation of the plan of their adoption. This is followed by a series of biographical sketches by Roy Lee Moodie, A.B., Ph.D., of the proper names associated with the history of anatomy, especially those preserved by their application to structures in the body. These sketches are arranged in an alphabetical list, from Abano to Zsigmondy. The second half of the volume consists of an alphabetic index and synonym register of B. N. A. terms, with their principal Latin and English equivalents.

* See JOURNAL, page 187.

In these days when anatomic nomenclature is still plastic, though no longer chaotic, the value of such a work to teachers and students is obvious. Apart from its usefulness as a work of history, it will be found of constant value for reference. Those who regret the disappearance of the proper names of distinguished anatomists from the terminology of the science will, to some extent, find consolation in the biographic preservation of the fathers of the science in this work.

General Surgery. By ALBERT J. OCHSNER, M.D., F.R.M.S., LL.D., F.A.C.S., Surgeon-in-Chief Augustana and St. Mary's of Nazareth Hospitals; Professor of Surgery in the Medical Department of the State University of Illinois. Vol. ii of The Practical Medicine Series, comprising ten volumes on The Year's Progress in Medicine and Surgery; under the general editorial charge of CHARLES L. MIX, A.M., M.D., Professor of Physical Diagnosis in the Northwestern University Medical School. Chicago: The Year Book Publishers. 1917.

The present volume is the first since Dr. John B. Murphy's death. Dr. Albert J. Ochsner, editor for 1917, pays a glowing tribute, in the introduction, to Dr. Murphy. He outlines his character, his reputation, his personality, his ability as a teacher, and the contributions which he made to surgery. Dr. Ochsner's is an appreciation, rather than an analysis; a tribute of friendship, not a critical estimate; a man is fortunate to leave behind him, not only an honored name, as did Dr. Murphy, but also competitors and contemporaries who were invariably friends; this is not often true, even in Chicago.

Under the title of Anesthesia, the dangers of gas oxygen are emphasized; twenty-six fatalities are recorded by Teter, nine in Cleveland; Rovsing mentions thirteen others; Gwathmey knows of "twenty to forty unreported deaths." These figures are truly startling when one considers that gas oxygen has been loudly praised as the safest of all anesthetics. Apophesine is not mentioned under the title "Local Anesthetics." The paragraphs dealing with the Carrel method of wound treatment are certainly not enthusiastic; this is unfortunate, for, notwithstanding its technical difficulties, the method is one of the greatest contributions to surgery which the war has produced.

More than one-third of the book (two hundred and twenty pages) is devoted to abdominal surgery, including hernia. Fractures cover a trifle more than twenty pages; this is a rather striking disproportion.

The book is of the familiar size, five by seven, and contains six hundred pages. It is well printed and bound and, on the whole, well illustrated. It is valuable far beyond its price, and should be within reach of every surgeon.

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CAMOUFLAGE.

THE excessive loss of the members of the medical corps in the present war calls attention to the measures that are being adopted to lessen it. One of these has been described in a recent issue of the JOURNAL in a letter from a neutral observer with the German army at the front, and no doubt the Allies have adopted the same plan, namely, to keep the surgeons away from the firing line, leaving the first-aid measures to be employed by the common soldiers for their comrades, on the battlefield, the surgeons being placed at the ambulance stations, the rail heads, and the base hospitals. Another means of preventing injury and death in the medical corps is one that applies in like measure to the other branches of the service, concealing coloration and patterning like the background the soldiers, cannon, aeroplanes and ships, the so-called camouflage of the French.

As long ago as 1896, Abbott H. Thayer, the American artist, described the principles which underlie protective coloration in the animal kingdom in an article in *The Auk*. His ideas were amplified in a monograph of 260 quarto pages with 16 colored plates and 140 figures, written by his son, and published by the Macmillan Company in 1909. This book was circulated in Europe, and has formed the basis of the efforts to make invisible the fighting forces now at war. Uniforms simulate the backgrounds, the faces of the snipers are painted, branches of trees hide the cannon from the aeroplanes, warships are made to counterfeit the sea by coloration and wave patterns.

The principle of camouflage is best understood by the artist rather than by the average citizen, for the artist is trained to reproduce nature as the eye sees it in its surroundings, under given conditions of light, and he, because of his training, gauges the effects of light and shade and pattern on distinguishability. Mr. Thayer showed that terrestrial animals are made inconspicuous by being colored darker on their backs and lighter on their bellies, when not seen against the sky. As the sunlight comes from the sky above, and most of the lighting falls on the animal's darker back, the dark color of the animal's back and the sunlight cancel each other, and thus the gradation of light and shade, that ordinarily serves to distinguish solid objects to the eye, is effaced, and the objects appear to be perfectly flat. Turn a dog lying on the ground on its back, exposing its lighter under side, and note its increased visibility. In this case the light of the belly is accentuated by the white light from above, and the dark of the back becomes darker by the shadow.

If, in addition to the arrangement of light and shade in the animal's coat, the skin mimics its nearby background in color, in pattern, or in both, its visibility to the eye of the observer is diminished. An important consideration in the study of inconspicuousness is the point of view of the observer and the position of the observed. The hawk sees the rabbit blended with the dead leaves over which it runs, whereas the fox, from his position near the ground, may see his quarry outlined against the sky, and therefore brought into sharp relief. The aeroplane must study the question of distinguishability from an entirely new standpoint; objects on the earth do not appear the same from

the sky as when viewed from the level of the ground. To the crouching lion the zebra with its stripes of black and white, imitating its background of reeds and sticks, is relatively inconspicuous so long as it is not outlined against the sky. The important factor in camouflage is, then, obliterative shading of the object, and the secondary factors are, mimicry of the background of the object in color and pattern, and the adaptation of these to the differing points of view of the observer.

At last Mr. Thayer's discoveries have taken root in this country, where they originated, and now a company of artists is at work in a camp in Connecticut studying the problems of camouflage for the benefit of the American army and navy, and it is to be hoped that results useful to the service and to the country will follow.

RECALLED TO LIFE.

A NEW journal, entitled *Recalled To Life*, is being published in England under the editorship of Lord Charnwood and Everard Cotes, and is to be devoted to the care, reëducation and return to civil life of disabled sailors and soldiers. It is to be issued periodically under the auspices of the War Office, the Pensions Ministry, and the Red Cross, and Order of St. John of Jerusalem Joint War Committee. The appeal of the journal is to those who are actively engaged in the administration of hospitals and in the conduct of local pension committees and technical institutes, and, with this object in view, each number will contain an article or articles on the treatment of some particular kind of disablement. The first article in the current number is by Sir Alfred Keogh, G.C.B., on treatment of the disabled, and is a memorandum prepared by him for the Anglo-Belgian Committee. It refers to pension arrangements, modern curative workshops, after-care of the blind, the problem of the deaf, and the provision of artificial limbs. Captain Basil Williams contributes a very full and authoritative article on pensions, in which, after a short historical summary, he gives details of the arrangements now brought into force. The Intelligence Department of the local Government Board has a report on work for disabled men in France and Germany. There is a paper by Sir Robert Jones, C.B., on "Orthopedic Surgery in Its Relation to the War." Throughout the volume are photographs of work being done by crippled

soldiers at the Military Orthopedic Hospital at Shepherd's Bush. The second number will contain reports on the recent International Conference on Disablement, in Paris.

The usefulness of such a journal can be measured only by the great and pressing need of the numbers of partly disabled soldiers and sailors, who must be provided with adequate training and facilities to enable them to return to civil life and lead normal and healthy existences.

MEDICAL NOTES.

NATIONAL BOARD OF MEDICAL EXAMINERS.—The National Board of Medical Examiners held its second examination in Washington, D. C., June 13 to 21. There were twenty-four qualified candidates, twelve of whom appeared for examination, the others having been ordered into active duty between the time of their application and the date of the examination. Of the twelve who took the examination, nine passed.

The next examination will be held in Chicago, October 10 to 18. The regular Corps of the Army and Navy may be entered by successful candidates, without further professional examination, providing they meet the adaptability and physical requirements. There will also be an examination in New York City in the early part of December.

WAR NOTES.

WAR RELIEF FUNDS.—On Aug. 4 the totals of the principal New England war relief funds reached the following amounts:

French Wounded Fund	\$244,598.00
Armenian Fund	211,615.89
Serbian Fund	123,121.90
Surgical Dressings Fund	114,489.01
Italian Fund	43,454.72
War Dogs' Fund	982.75

BOSTON AND MASSACHUSETTS.

WEEK'S DEATH RATE IN BOSTON.—During the week ending July 28, 1917, the number of deaths reported was 188, against 169 for the same period last year, with a rate of 12.69, against 9.47 last year.

There were 28 deaths under one year of age, against 25 last year.

The number of cases of principal reportable diseases were: diphtheria, 49; scarlet fever, 12; measles, 52; whooping cough, 39; typhoid fever, 6; tuberculosis, 58.

Included in the above were the following cases of non-residents: diphtheria, 3; scarlet fever, 2; measles, 1; typhoid fever, 1; tuberculosis, 7.

The number of deaths from these diseases were: diphtheria, 4; scarlet fever, 1; measles, 2; tuberculosis, 16.

Included in the above were the following non-resident deaths: tuberculosis, 2.

The Massachusetts Medical Society.

NOTES MADE OF THE QUESTIONS ASKED AT THE CONFERENCE OF THE SPECIAL COMMITTEE ON SOCIAL IN- SURANCE AT THE STATE HOUSE, JULY 25, 1917.

PRINTED to show the temper of the committee and the sort of questions that are asked members of the profession when they appear before a committee of the General Court.

A. K. STONE, *Chairman of Special Committee of Mass. Med. Society on Health Insurance.*

The following are the more important questions asked of Dr. David L. Edsall and Dr. A. K. Stone, many of them having been asked of each. Dr. Edsall left the room before Dr. Stone's interview.

The Chairman introduced Dr. Edsall as:

Dr. Edsall of the Massachusetts General Hospital, whom we have asked to come here and give his views on this problem of health insurance. He was good enough to come, and we shall be glad to hear what he has to say to help us in the solution of this problem.

The following questions were asked in the course of the discussion:

1. I thought the essence of this movement was that those who could not afford to get such care would do so with this legislation.

2. It is simply a question of degree, isn't it, for those who have a little, rather than for those who have nothing and now go to the charitable institutions for care?

3. When it comes to a question of health or life, why shouldn't it be an immaterial question whether a man has ten cents or a million dollars in his pocket, and why doesn't the medical profession dwindle into almost insignificance?

4. You appear as an expert on the proposition of social insurance. Are you here to protect the gate receipts of the medical profession? . . . Do you resent the question as to what you are here for? . . . If it is to protect the gate receipts, I think you are a little ahead of the game.

(The chairman interposed and said the doctor had been invited to come and give his views on the proposition.)

5. Would this tend to throw the practice under this law into the hands, we might say, of inexperienced men who have just graduated, or to the man who has been in practice for 15 or 20

years,—the bright, successful man? Where would you grade these men? How would you handle it so as to be fair toward the successful practitioner, as well as to the man who has just started out? Would it tend to throw it into the hands of those who have just graduated?

6. In my own city, while they didn't want to come out with it, there was quite a fear that it might eliminate them in a certain way, and go to a cheaper line of physicians,—that is, cheaper as to experience; those who had recently graduated would be used, and the others might be shut out.

Dr. Edsall suggested creating a board to include all the reputable physicians in the vicinity; then there would be practically entire freedom of choice.

7. You would make it large enough so the people couldn't criticize it; have enough in it so there would be a choice?

8. Do you believe in social insurance?

9. Do you believe it should be compulsory?

10. Do you believe, as a matter of legislative principle, that as soon as we can get this bill through, which we can do, we should say to a man who is struggling along on \$15 a week with ten children, "You shall separate yourself from ten cents every week"? Or should we allow him to go to —?

11. What do you think of a proposition like this: That it should be compulsory on the part of the state, compulsory on the part of the employer, but optional on the part of the employee?

12. Would you consider that a wise way rather than the compulsory?

13. A man who really wanted the insurance but refused to take it would be just where he is today. The man who really needed it the most wouldn't get it.

14. Would it appeal to the thrifty employee who was hard up financially and against his private benefit association, that while the employer and state shared the burden with him the rate would be lower?

15. Do you know people who would be affected by it?

16. In Germany and England is the rate for insurance pretty high?

17. Would it keep it high although it were compulsory?

18. Do you think this compulsory health insurance is much of an advantage for shiftless men? Is the shiftless man going to the dogs anyway? Isn't it better, rather than to help him in sickness and health, to stimulate him by keeping in the background the prospect of an almshouse in the end?

19. We must work on the proposition that a man is shiftless or he isn't. If he is shiftless, how is this going to be an accurate rendering of the situation? You may keep him in good health, but he may indulge in some other form of extravagance just as hard for his family.

20. (To Dr. E.'s remark that he would be perfectly willing to be compelled to take out insurance). Would you be quite so enthusiastic if your income, instead of being \$25,000 a year were only \$750 a year? Would you be as broad-minded?

21. Has social insurance really lengthened life in other countries?

22. Is length of life any longer today than it was 50 years ago?

23. How do you account for the fact that with the growth of medical science, we have more mental and nervous disorders today than we ever had before?

24. Are men using their heads more and their bodies less than they were 50 years ago?

25. If this were a compulsory proposition, do you think it would be a good thing to carry it out?

26. You don't think that what employers would oppose and the employees would oppose would stand a very rosy chance of going through the legislature, do you?

27. I would like to ask the doctor if, in favoring the scheme of optional insurance to the employee, it is as a scheme by itself, or as a step toward compulsory insurance?

28. If any system were started, even on a voluntary basis, would it inevitably lead to a compulsory basis?

29. The apparent statistics are that, in Germany, for instance, in 1885, when the compulsory law was started, the days of sickness averaged about 5.9 per year per member, while it has gone up now to something over 9. Do you doubt these facts or figures? Don't you suppose they are accurate? . . . You think these statistics may be all right, but are subject to question?

30. Referred to the tendency to malingering.

31. You spoke of how, if we had a system, the doctors should come into it as a medical profession. How can we find out what is economical and at the same time fair to the medical profession? I don't believe that anybody wants to be unfair to the medical profession, but it looks to me that the chance is good, if men like ourselves should get up a law, that we should be unfair to the public or to the medical profession. We should have to make a guess and would make a botch of the job. How can we get definite suggestions as to what is fair to the medical profession, and what is an economic method of handling the work?

Referred to work in hospitals and dispensaries as being cheaper than sending a man to call on a patient. Of course, if the patient is sick abed, that is another question.

32. I question whether we can get real action out of the medical profession until we have persuaded them that something is going to happen. Certain men to whom I have talked haven't shown any interest. If they get scared a little bit, they will think a little bit, but now they are apparently too busy to think. Would it be fair

for us to ask the Massachusetts Medical Society?

33. In your work at the hospital, I suppose you have come in contact with cases where it has been proposed to investigate the poverty of certain cases to see if it might be alleviated.

34. We might get facts from the dispensaries, clinics, and possibly the overseers of the poor.

35. Are you familiar with the recent legislation in California, as to insurance?

36. I would like to ask whether this is a state proposition, or a national proposition? Or whether we have got to take it up in a few states as to its feasibility, and then have the Government take it over?

37. I understand the Medical Society has a stenographer here; if they are involved in such a proceeding as ours, why can't they come here instead of our sending for them?

38. When the tuberculosis hospital was planned at Westfield, do you know whether any physicians appeared and took the ground that such a proceeding might interfere with their practice or their incomes? . . . Do you understand it has interfered with the financial returns of the medical profession?

39. Is it not possible this may cause a stimulus to medicine and prove an advantage to the medical profession, rather than a disadvantage?

40. Do you think if a medical man could be found so ignoble as to take a financial interest in his practice, that he would be justified in appearing before this committee and opposing such legislation, as it would decrease his income?

41. A decrease in the income of the profession might interfere with its proficiency.

42. Do you think length of life has kept step with the advance of medical science? Do you think that if people are living longer today, it is simply because they think they are, or because they really are?

43. Are you familiar with the subject of health insurance? Have you formed a definite opinion as between compulsory and voluntary insurance?

44. Don't you think that a thrifty man with a small income who wants to take care of himself is entitled to a system shared by the Commonwealth? Wouldn't it be a step forward?

45. To a thrifty man with a small income, a lower rate is well worth while. He could get a better rate than he can get out of his private insurance company. (Referred to the fact that the state wasn't in it for the money, whereas the private company is.)

Referred again to the "reason the medical profession is not here is because they have not scented a fear; but if it comes to a question of affecting their incomes, they will look into the matter."

46. Possibly there is not a great deal of revenue from the people with small salaries?

47. Just how can we get a report from the

Massachusetts Medical Society on this question, as to their opinion as to how medical insurance ought to be worked out? We can't make any progress along this line unless we take it in sections. If we have social insurance, what would be the proper machinery? We want to know, if we ask the medical society, how we should take action, and how much action we are likely to get.

48. What middle road are we to take between the health of the community and the incomes of the medical profession? Suppose we find a certain bill is going to increase the health of the community and cut the profession in two: are we to follow the pestle or the crowd? . . . It is pre-eminently a question of the health of the people? (Suggested bounties for physicians.)

49. There is the question of preventive medicine. There has been a great criticism of this recent bill to the effect that it did very little for preventive medicine. My whole idea is that, if we are going to have this health insurance, the first thing is to stop sickness because we want to reduce the cost of the insurance.

I should like to ask just what form of question we should put to the Massachusetts Medical Society in order to get the most comprehensive report; not tying it down to last year's bill, but thinking of next year's bill, and a bill five years from now. We want to create a new foundation and see what we can get; then see if we can get it passed after it is formulated.

50. I would like to ask, as to the operation of the law, as to the grade of physicians, or the character and quality of the physicians in the community,—what base you would start on to carry this law out? Dr. Edsall suggested that we have a panel of physicians in certain communities, and that all reputable physicians join this panel.

. . . I would like to ask whether every man who is registered should be considered one of these, and whether we should put a stipulated price on bills? Those are the things which the medical men feel, and which we should be glad to have them solve. Whether it should be a young graduate or the same price for the experienced men,—a flat rate, such as, mumps, \$2.00; typhoid fever, \$1.50, or something of that kind; something that wouldn't destroy their business. It would be a great help if they could give us some information along that line. If we could get in touch with the medical men, we could handle the question much more easily.

Isn't it also true that if this health insurance is going to happen and we don't know how to handle it, the medical profession have got to take hold of it? Everybody wants to discount last year's bill; Senator Washburn wants to hang on compulsory insurance to the employee. Somebody else wants to cut it down to a little circle of employees. Everybody says "Crawl before you leap." We might have preventive

medicine. The medical end of this, to my mind, if not the most complicated, looks so now.

51. Don't you think the most of the patients of the general majority of physicians are those whose incomes are less than \$25 a week?

52. If we are going to have insured medical attendance, wouldn't it be one of the primary things that the state take hold of it?

53. Do you believe that in order to pass this legislation, it would be necessary to recommend far more stringent sanitary conditions in mercantile and industrial establishments?

54. Do you believe a good deal of the lack of health and the unhealthy condition of the workers is due to some of the conditions under which they have to labor?

55. Do you think the average person who would be benefited is the person who is over-eating?

56. Don't you think that the average factory conditions are as satisfactory as the average home conditions? Don't you think the workman in the factory is taking as few chances as in his home? That there are more sanitary regulations, better toilet-rooms, etc.?

57. Is the medical profession near enough to normal today to take up the discussion, or are they like so many other people, with their minds on the war and upset by losing so many of their best men, that it is a difficult time?

58. What percentage of the medical profession is engaged in war service?

NOTES FROM THE DISTRICT SOCIETIES.

WORCESTER.—In response to a petition signed by Dr. A. W. Marsh and nine other Fellows of the Society, the President called a "special meeting of the Society for the purpose of taking action upon the matter of division of fees received from patients of Fellows who have or may hereafter enter the army or navy of the United States, and such other matters as may legally come before the meeting."

The meeting was at G. A. R. Hall, 55 Pearl Street, Worcester, at 4.15 p.m., Wednesday, August 1, 1917.

ERNEST L. HUNT, *Secretary*.

RECENT DEATHS.

A. W. SMITH, M.D., of Milford, N. H., died at his home in that city on July 22. Dr. Smith was born in Waltham, Mass., in 1853. He was graduated from Dartmouth College and Dartmouth Medical School, and, after a year of study in New York, established himself in practice in Milford in 1878. He served for ten years as town moderator, was for twenty years a member of the school board, and in 1881-1880 was representative in the State Legislature. He had remained a widower since the death of his wife in 1902.

DR. FRANK H. WHITNEY, a veterinary surgeon of Lexington, Mass., was instantly killed, on July 30, by being run over by a train. He was sixty years of age.